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WATER BULLETIN NUMBER 4

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Flow of the Rio Grande  
and  
Tributary Contributions

*From San Marcial, New Mexico to  
the Gulf of Mexico*

1934

ANALYSES OF WATER SAMPLES

STORED WATER IN LARGE RESERVOIRS OF THE  
RIO GRANDE BASIN

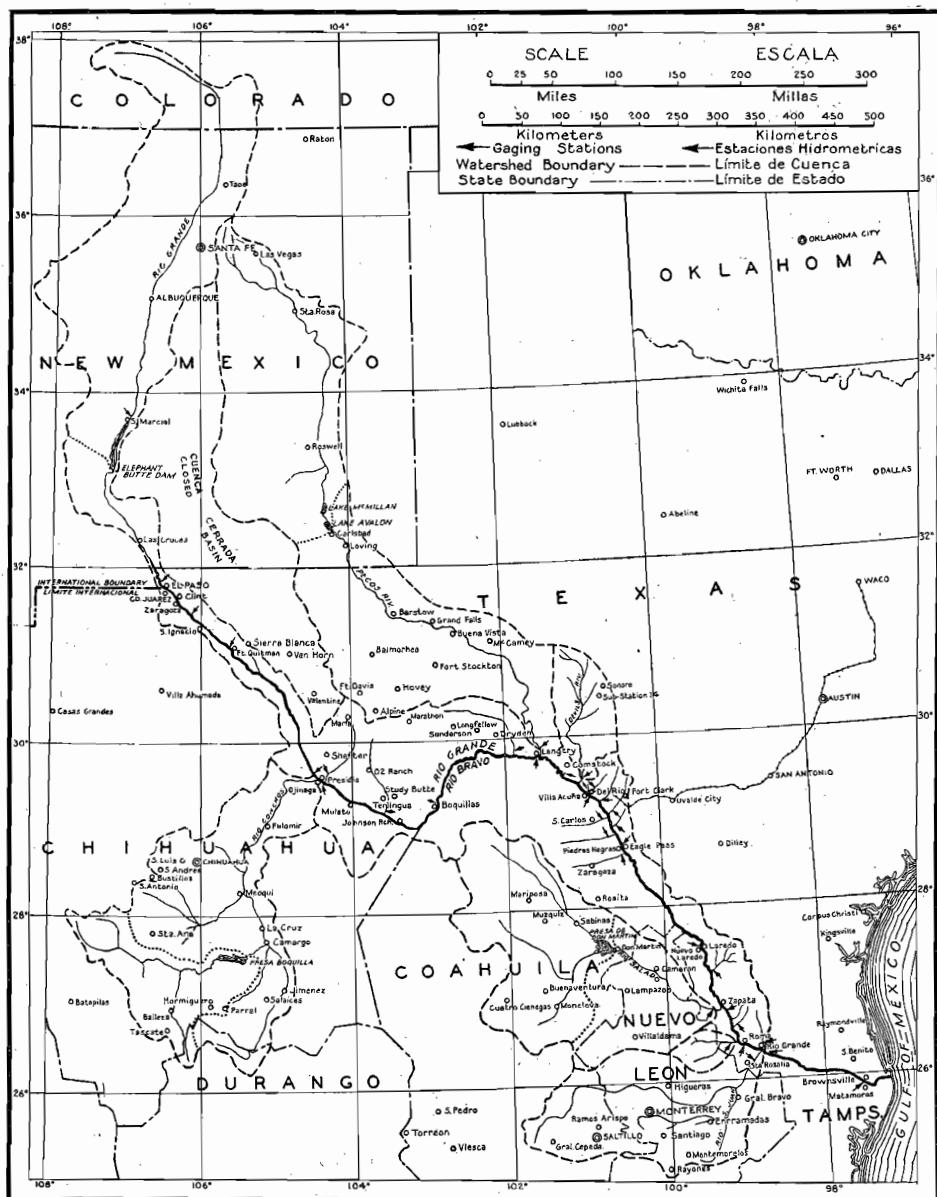
EVAPORATION FROM FREE WATER SURFACES  
1934

RIO GRANDE AND TRIBUTARY FLOW AT  
VARIOUS STATIONS  
1924 to 1928  
*Inclusive*

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Rio Grande Drainage Basin  
Cuenca del Rio Bravo

## FOREWORD

This compilation of stream discharge and related data is the fourth unified publication relative to the cooperative determination of the flow of the international portion of the Rio Grande. The first such publication was Water Bulletin No. 1 covering the year 1931. These data are published jointly by the United States and Mexican Sections of the International Boundary Commission and represent the results of stream flow measurements made on the Rio Grande and on certain tributaries near their confluence, from San Marcial, New Mexico, which is the head of Elephant Butte reservoir, to the Gulf of Mexico, for the year 1934.

International stream gaging was begun in 1897, with the operation of the station at El Paso, Texas. A number of stations on the Lower Rio Grande and tributaries below El Paso were established in 1900 and operated until 1914. From 1914 to 1923 all such work was suspended except for a few months in 1919. In 1923 the work was resumed and carried on independently by the two countries until 1931 when the present cooperative work began.

The duties and functions of the United States Section of the International Water Commission were transferred to the United States Section of the International Boundary Commission by Act of June 30, 1932. On January 1, 1932, the Mexican Section of the International Boundary Commission similarly took over the duties of the Mexican Section of the International Water Commission.

This cooperative arrangement for obtaining hydrographic data is the result of the concurrence and agreement by both sections of the International Commission that a co-ordinated result should be insured and that an accurate and complete hydrographic record of international flow was necessary.

Of stream gaging stations on the Rio Grande, those at Laredo, Texas, and Matamoros, Tamaulipas, were operated in 1933 by the Mexican Section of the Commission, the others by the United States Section. Each section operated the gaging stations on tributaries entering the Rio Grande from its own country, or on floodways or diversions within its borders.

## ACKNOWLEDGMENTS

Data published herein relative to chemical and bacteriological analyses, silt, stored water, and evaporation, have been furnished by the following agencies within the two countries. Specific acknowledgment is made where the data appears. United States Department of Agriculture, United States Bureau of Reclamation, Agricultural and Mechanical College of Texas, Federal Board of Public Improvements of Nuevo Laredo, Tamaulipas, National Irrigation Commission of Mexico, Cia. Agricola y de Fuerza Electrica Del Rio Conchos, S. A., and the Mexican Department of Agriculture and Development.

## STREAM GAGING STATION RECORDS - 1934

The records of the various gaging stations appear in this publication in the same sequence as they naturally occur in passing down the river.

There is here reported the results of measurements at seventeen points along the Rio Grande and the contributing flow from twenty tributaries. The flow of the Rio Conchos was not measured directly, but its flow may be calculated by taking the difference in flow at the Upper Presidio and Lower Presidio stations and adding thereto the diversions between the Upper and Lower Presidio stations. An estimate of these diversions is reported herein. Peak flows at Hidalgo Station, near Hidalgo, Texas, are also reported here.

## CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES - 1934

Collected here are the available data with reference to the quality of the water of the Rio Grande for the year 1934, with reference to its use particularly for irrigation.

## CHEMICAL AND BACTERIOLOGICAL ANALYSES OF RIO GRANDE WATER

For the year 1934 there is shown the chemical and bacteriological analyses of water from the Rio Grande at Nuevo Laredo, Tamaulipas, with reference to its use for domestic water supply purposes.

## SILT SAMPLING OF RIO GRANDE WATER

Silt sampling data are presented here for the year 1934. They are of particular value when considering the probable life of storage reservoirs on the river.

## STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

There is shown here the quantity of water in storage on the last day of each month of 1934 in the large reservoirs of the Rio Grande basin.

## EVAPORATION FROM FREE WATER SURFACES

For estimating evaporation losses from reservoirs, there are collected here experimental results from pertinent evaporation stations in and adjacent to the Rio Grande basin for the year 1934.

## STREAM GAGING STATION RECORDS - 1924 to 1928

Discharge records for certain gaging stations on the Rio Grande and tributaries are published here covering the years 1924 to 1928 inclusive.

## RIO GRANDE AT SAN MARCIAL STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car and winch located at new railroad bridge about one mile below San Marcial, New Mexico. Zero of gage is 4,455.38 feet above United States Coast and Geodetic Survey sea level datum.

**Records:** Based upon 101 meter measurements at cable about 1,000 feet above new railroad bridge. Computations by shifting channel methods. 1934 records good.

**Records Available:** January, 1895, to December, 1934.

**Remarks:** January 29, 1895, gage at A. T. & S. F. railroad bridge  $\frac{3}{4}$  mile below San Marcial with gage zero at 4,444.75. May 28, 1920, dike broke above gage resulting in establishment of gage June 14, 1920, on highway bridge  $\frac{1}{2}$  mile above San Marcial with gage zero, 4,452.33. Beginning July 23, 1920, old gage at railway used again. May 6, 1921, same dike broke and from May 10, 1921, two channels were metered until February 16, 1922, after which a new gage with zero at 4,461.53 on highway bridge  $\frac{1}{2}$  mile above San Marcial was used. The zero of this gage changed to 4,463.33 on May 3, 1922, and to 4,462.33 on December 29, 1923. Gage zeros reported here are all in feet above United States Coast and Geodetic Survey mean sea level datum. March 13, 1932, gaging station moved to its present location.

There are many irrigation diversions above this station in New Mexico and Colorado which modify the river flow. With all closed basins eliminated the drainage area above this station is 27,806 square miles, all in the United States.

**Previous Extreme Flows:** The greatest recorded flow occurred September 24, 1929, when the peak gage reading was 7.80 and the peak flow was estimated to have been 47,000 second feet. The river is sometimes dry. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	928	728	960	173	314	10.4	0	0	* 706.	* 108	* 6.2	152
2	922	732	1,010	130	261	0	0	0	* 1,120.	* 60.3	* 6.4	175
3	931	736	886	176	279	* 10.8	0	0	* 514.	* 22.1	* 7.0	203
4	887	717	803	214	255	28.8	0	0	* 107.	* 16.0	* 8.0	222
5	908	783	682	334	170	29.2	0	0	* 101.	* 8.8	* 9.5	242
6	921	787	617	469	* 166	13.3	0	0	* 97.6	* 3.2	* 9.7	251
7	902	823	587	458	* 163	* 12.3	0	0	* 72.8	* 2.8	* 10.5	244
8	843	826	* 394	402	* 159	* 6.8	0	0	* 121.	* 2.7	13.5	273
9	800	796	* 414	367	* 117	* 3.2	0	0	* 688.	* 2.2	13.7	273
10	829	828	* 434	235	* 75.7	* .2	0	0	* 1,170.	* 2.5	15.3	318
11	845	908	* 454	244	* 34.0	0	0	0	* 403.	* 2.6	28.7	346
12	738	925	* 474	146	* 26.6	0	0	0	* 213.	* 11.6	25.9	377
13	632	942	* 494	136	* 19.1	0	0	0	* 198.	* 21.1	32.0	386
14	657	967	* 514	108	* 11.7	0	0	0	* 218.	* 24.4	30.9	425
15	666	851	* 475	100	* 11.6	0	0	0	* 200.	* 25.6	26.3	462
16	701	720	481	334	* 11.6	0	0	0	* 156.	* 18.6	28.5	488
17	714	731	426	1,230	* 11.5	0	0	0	* 86.6	* 12.8	29.5	505
18	720	766	349	1,420	* 12.8	0	0	0	* 45.3	* 8.5	31.1	532
19	671	810	291	1,280	* 14.1	0	0	0	* 37.0	* 6.9	32.7	561
20	701	854	257	1,150	* 15.4	0	0	0	* 32.7	* 5.6	26.5	592
21	738	890	311	970	* 13.3	0	0	0	* 28.2	* 4.5	31.6	616
22	751	853	348	742	* 11.2	0	0	0	* 24.4	* 5.7	37.5	659
23	781	801	236	656	* 9.12	0	0	0	* 22.2	* 7.1	29.7	652
24	827	860	194	583	* 11.4	0	0	0	* 20.1	* 8.3	41.2	656
25	763	897	197	625	* 13.7	0	0	0	* 2,900.	* 7.3	82.5	629
26	804	924	196	579	* 16	0	0	0	* 2,880.	* 6.5	112	618
27	821	936	174	485	* 12.	0	0	0	* 288.	* 5.7	122	608
28	823	924	199	379	* 7.91	0	0	5,910.	* 126	* 5.5	145	613
29	817	...	203	284	* 3.86	0	0	7,210.	* 127	* 5.5	152	635
30	810	...	222	335	* 7.27	0	0	2,200.	* 156	* 5.5	140	627
31	796	...	175	...	* 10.7	0	0	659	....	* 6.0	660	

Month	Extreme Gage Height—Feet			Extreme Second Feet			Acre Feet		
	High		Low	High		Low	Average Second Feet	Total	
	High	Low		Dates				Per Sq. Mile	
January.....	6.36	5.83	6	1,040.	14	558	795	48,900	
February.....	6.29	5.90	14	1,040	3	657	833	46,300	
March.....	6.36	5.27	2	1,090.	27	50.2	434	26,700	
April.....	6.69	5.03	18	1,770.	16	94.8	495	29,500	
May.....	5.67	3.95	3	399.	29	* 4.1	72.4	4,450	
June.....	4.73	....	5	52.0	0	0	3.83	228	
July.....	....	....	....	....	....	0	0	0	
August.....	8.35	....	28	9,910.	0	515	31,700		
September.....	7.27	* 2.98	25	7,030.	24	* 20.1	* 429	* 25,500	
October.....	* 3.33	2.42	1	* 118.	9	2.0	14.0	861	
November.....	* 4.35	* 2.57	29	234.	1	6.0	42.8	2,550	
December.....	5.85	* 3.58	31	692.	1	* 94.0	452	27,800	
Yearly.....	8.35	....	....	9,910.	0	0	338	244,480	8.79

\* Partly Estimated

## INTERNATIONAL BOUNDARY COMMISSION

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## RIO GRANDE AT EL PASO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car and winch located in the pass opposite Courchesne quarry, four miles northwest of El Paso, Texas. Zero of gage is 3,720.65 feet above United States Coast and Geodetic Survey mean sea level datum.

**Records:** Based upon 135 meter measurements during the year. Computation by shifting channel methods. 1934 records good.

**Records Available:** May, 1897 to December, 1934. Records are also available for station at old Fort Bliss, 1,500 feet above International dam and three miles below present station, from May, 1899 to June, 1893, and for station at pump house of Smelter Company, one mile below present station, from January, 1895 to May, 1897.

**Remarks:** There are many irrigation diversions above this station in Texas, New Mexico and Colorado. The river flow is regulated at Elephant Butte reservoir. With all closed basins eliminated the drainage area above this station is 32,819 square miles, all in the United States.

**Previous Extreme Flows:** The greatest recorded flow was on June, 12, 1905, when the mean daily flow reached 23,700 second feet. Prior to 1916 the river sometimes was dry. Numerous records of extremes may be found in Water Bulletin No. 1.

*Mean Daily Discharge in Second Feet and Annual Summary, 1934*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	231	135	740	703	878	982	1,560	1,020	1,550	560	176	165
2	213	142	784	894	833	970	1,510	1,000	1,060	594	174	165
3	206	143	705	864	934	915	1,410	1,100	1,060	548	178	166
4	212	151	629	818	1,020	1,050	1,260	1,170	960	496	178	164
5	217	150	538	784	982	949	1,370	1,160	881	404	178	168
6	212	686	512	864	985	850	1,160	1,200	792	323	194	157
7	203	799	508	891	943	837	1,090	1,060	826	391	234	155
8	197	774	553	1,080	835	916	1,030	1,190	830	310	254	151
9	203	736	572	1,160	821	1,000	1,060	1,250	1,200	284	261	154
10	204	705	669	1,020	914	1,110	926	1,260	1,410	246	259	158
11	191	828	641	1,030	784	1,010	852	1,250	992	245	209	158
12	183	864	652	1,190	*1,000	921	776	1,330	861	319	197	158
13	177	717	655	1,110	*1,020	860	1,040	1,260	787	304	188	157
14	180	663	698	908	1,070	780	1,010	1,220	664	325	180	157
15	184	645	679	1,000	894	937	1,070	1,240	629	365	174	156
16	170	598	591	1,220	994	941	1,330	1,200	611	333	173	160
17	166	621	628	1,110	976	953	1,140	1,180	699	297	175	159
18	165	723	692	1,060	1,020	1,110	1,210	1,170	683	265	177	156
19	166	794	744	1,060	1,000	954	1,150	957	702	258	189	149
20	143	691	714	903	988	951	1,200	1,120	701	241	193	146
21	146	658	642	946	921	1,160	1,210	1,330	641	215	193	143
22	258	627	678	867	911	1,700	1,360	1,400	653	210	192	144
23	207	707	693	1,060	1,030	1,370	1,380	1,330	630	208	178	151
24	168	581	805	1,040	1,050	1,170	1,240	1,260	668	194	183	148
25	169	671	1,050	899	1,140	1,140	1,270	1,430	691	189	170	143
26	167	664	1,230	916	1,150	1,070	1,350	2,570	661	*184	177	144
27	158	565	994	818	1,070	1,040	1,250	1,770	626	*188	183	145
28	148	654	840	719	1,120	1,070	1,300	1,860	609	*190	178	160
29	139	...	761	768	1,120	1,250	1,320	1,090	574	*188	166	164
30	140	...	714	860	1,100	1,300	1,300	1,630	563	184	164	166
31	137	...	596	...	985	...	1,080	1,440	...	178	...	168

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
	High		High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	1.71	1.20	21	280	16	122	183	11,200		
February.....	2.62	1.21	7	929	1	135	596	33,100		
March.....	2.90	1.86	26	1,300	5	365	707	43,500		
April.....	2.85	2.07	12	1,280	1	500	952	56,700		
May.....	3.06	2.37	26	1,370	11	692	987	60,700		
June.....	3.29	2.51	22	1,750	6	750	1,040	62,000		
July.....	3.34	2.62	1	1,640	12	700	1,200	73,800		
August.....	4.54	2.77	26	3,610	19	900	1,300	80,200		
September.....	3.38	2.35	1	1,780	29	522	807	48,000		
October.....	2.48	1.33	2	663	31	175	298	18,300		
November.....	1.70	1.40	10	284	29	155	191	11,400		
December.....	1.50	1.42	5	186	24	138	156	9,590		
Yearly.....	4.54	1.20		3,610			122	702	508,490	
									15.5	

\* Partly Estimated

## RIO GRANDE AT TORNILLO BRIDGE STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located at highway bridge 2 miles west of Tornillo, El Paso County, Texas. Zero of gage is 3,578.63 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 78 meter measurements during the year. Computation by shifting channel methods. 1934 records good.

**Records Available:** October, 1927 to December, 1934. Station maintained for several years prior to October, 1927, by United States Bureau of Reclamation.

**Remarks:** The river flow is greatly modified at this station by irrigation diversions in Mexico and in the United States and by Elephant Butte reservoir in the United States.

**Previous Extreme Flows:** The greatest recorded flow was on August 14, 1929, when the extreme gage height was 14.72 feet and the extreme flow was 3,440 second feet. The river is sometimes dry. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	190	141	264	29.9	32.1	104	273	*18.8	494	55.0	5.0	7.8
2	205	148	409	20.5	49.5	107	520	* 9.8	667	66.3	2.2	33.9
3	182	147	430	14.6	41.1	133	500	* 4.11	399	43.4	3.8	121
4	191	148	405	33.2	116	123	577	1.53	260	33.3	5.6	130
5	175	150	396	6.8	99.2	* 48.4	366	36.8	156	84.7	10.0	132
6	161	154	285	16.8	160	* 56.8	332	23.4	* 96.0	69.7	14.6	111
7	186	512	161	18.0	124	* 5.5	179	* 4.35	* 4.67	104	22.0	76.6
8	181	634	138	20.6	37.2	2.4	158	0	* 62.4	210	20.5	66.1
9	166	580	*106	95.0	* 11.3	* 2.5	158	0	* 94.8	169	66.0	84.5
10	167	561	*116	66.2	* 3.86	* 10.7	33.1	5.16	* 290	159	124	59.9
11	168	556	*303	17.6	6.19	72.1	* 15.3	21.1	480	218	125	4.4
12	166	561	*305	17.6	13.0	61.8	* 10.6	6.45	286	185	89.1	5
13	147	532	*268	57.8	87.5	* 5.66	* 1.51	32.6	* 100	244	23.4	4.3
14	146	520	*242	75.6	142	* 2.22	* .37	29.2	* 64.7	234	21.7	6.9
15	148	400	*198	78.4	70.9	2.78	* 4.14	14.2	* 11.1	199	9.4	13.5
16	150	366	* 50.6	105	137	* 1.43	* 13.1	53.3	* 16.7	245	1.6	14.2
17	154	348	65.6	240	56.1	* 4.26	* 5.85	44.0	* 42.4	112	4.4	16.7
18	150	396	79.2	211	22.0	* 6.56	* 1.95	37.5	* 10.9	10.6	42.0	18.7
19	152	460	131	72	16.6	* 1.03	* 6.40	27.9	* 1.36	3.9	129	10.9
20	154	453	196	95	29.3	* 2.86	12.8	36.4	* 9.42	8.8	113	36.3
21	146	424	134	26.7	99.1	* 1.33	26.7	4.2	13.2	22.0	150	58.3
22	139	345	29.3	22.5	8.5	3.18	51.1	17.3	42.2	46.7	142	79.8
23	166	269	10.3	51.1	9.7	184	166	23.8	56.4	14.1	132	82.6
24	229	304	67.9	92.8	17.1	127	240	41.5	89.5	101	115	127
25	198	295	286	87.0	73.4	87	62	56.5	52.8	98.3	77.8	119
26	163	334	492	23.1	102	* 9.24	24.8	331	33.2	119	53.5	125
27	156	324	458	17.8	305	* 1.56	141	582	57.3	123	15.6	98
28	143	229	357	17.8	351	* 9.64	121	597	77.9	107	25.9	82.5
29	142	...	261	66.9	356	* 13.7	305	595	61.6	103	30.0	84.7
30	140	...	53.4	51.6	264	106	271	372	25.0	111	15.0	98
31	142	...	93	...	215	...	* 52.8	520	...	67.5	...	132

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	10.97	10.60	2..	245	23	130	165	10,100		
February.....	12.17	*10.60	7	828	1	135	368	20,400		
March.....	11.71	9.18	26	615	23	*2.71	221	13,600		
April.....	11.23	9.15	17	355	28	* .3	58.3	3,470		
May.....	11.46	9.10	28	467	11	2.5	98.6	6,060		
June.....	10.90	8.86	23	264	22	* 1.14	43.2	2,570		
July.....	11.81	* 8.96	2	629	14	* .28	149	9,180		
August.....	12.12	...	31	783	..	0	114	7,040		
September.....	12.15	9.09	2	822	21	* .50	135	8,040		
October.....	10.95	9.15	16	276	23	* 0	109	6,680		
November.....	10.62	8.97	22	180	16	* .8	53.0	3,150		
December.....	10.58	8.98	24	183	13	* 0	65.7	4,040		
Yearly.....	12.17	...	...	828	..	0	130	94,330		

\* Partly Estimated  
†Estimated.

## RIO GRANDE AT FORT QUITMAN STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located at lower end of El Paso Valley,  $1\frac{1}{2}$  miles below Old Fort Quitman and  $11\frac{1}{2}$  miles south of Finlay, Hudspeth County, Texas. Zero of gage is 3,454.06 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 55 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** January, 1923 to December, 1934.

**Remarks:** There are many irrigation diversions above this station in New Mexico, Colorado, Texas, and Mexico. The river flow as regulated at Elephant Butte reservoir. With all closed basins eliminated the drainage area above this station is 34,450 square miles; 33,616 being in the United States and 834 in Mexico.

**Previous Extreme Flows:** The greatest recorded flow was on September 11, 1925, when the extreme mean daily gage height was 7.02 feet and the mean daily flow was 2,600 second feet. The smallest daily flow was 20 second feet in July 1925. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	221	186	370	192	102	170	80.1	92.5	268	72	52.4	91
2	214	178	355	182	136	170	94.6	65.8	*282	62.3	67.9	90
3	216	176	371	130	114	157	114	32	*228	62.8	91.7	93
4	220	174	435	*113	116	142	215	18.8	*276	73.5	85.5	109
5	211	183	479	*87.5	136	133	262	20.8	*217	67.9	84.5	85
6	208	183	480	*93	137	129	303	19	*93.7	68.7	89.1	107
7	202	183	413	98	144	114	220	17.6	117	75.9	80.4	122
8	197	230	333	102	147	105	168	23.7	*302	78.8	81.1	115
9	198	446	265	108	134	88.7	143	14	*272	66.8	72.8	108
10	198	469	246	102	119	72.9	106	6.7	*169	42.7	81.9	97
11	196	485	225	104	104	81.4	79.3	11	179	41.8	82.9	91
12	192	438	225	117	99.3	87.4	43.6	16.3	190	44.3	64.7	99
13	195	490	196	91.3	103	81.2	20.2	26.6	252	53.2	67.2	110
14	205	509	227	103	111	72.9	8.3	53	217	64.8	71.4	87
15	208	482	205	117	116	49.4	6.2	40.4	165	78.3	94.7	80
16	204	448	174	132	114	42	5	39.7	150	91.6	96.3	83
17	204	418	166	147	116	44.3	4.2	49.8	127	97.6	80.7	77
18	202	392	170	137	*119	50.3	3.4	48.6	120	110	76	85
19	203	415	189	134	*106	41.2	11.6	50.1	95.8	142	79.1	109
20	202	453	172	150	*103	36.7	9.3	51	91.4	142	80.5	96
21	203	489	172	155	*103	32.2	7.2	47.2	82.2	99.4	72.3	90
22	204	466	176	164	*103	32.3	10.9	40.2	87.4	89.7	80.7	79
23	200	449	202	164	*95.1	32.4	35.2	32.1	71.8	94.4	88.8	66
24	195	397	205	149	*94.6	31.2	34.9	46.2	82.3	99.6	93.6	67
25	188	370	196	145	*106	37.9	33.9	122	76	73.6	108	71
26	219	416	240	144	*89.6	39.3	32.9	148	71.7	49.1	104	79
27	210	414	269	149	*399.4	36.7	37.1	140	64.1	41.5	99.2	83
28	195	372	360	144	*114	36.1	50.6	139	66.1	42.1	83.5	93
29	195	...	348	140	*148	53.8	48	211	77.5	46.7	110	99
30	187	...	259	117	*185	57.7	59.2	296	69.8	52.7	94.5	96
31	191	...	254	...	*187	...	74.6	312	....	54.7	....	84

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq Mile	
	High	Low	Dates		Dates					
January.....	2.24	1.92	1	238	30	184	203	12,500		
February.....	3.40	1.82	14	530	4	169	368	20,500		
March.....	3.33	1.73	6	504	20	150	271	16,600		
April.....	2.09	1.23	1	205	5	80.4	131	7,770		
May.....	1.98	1.20	30	196	26	84.5	119	7,340		
June.....	1.87	.66	2	178	22	29.8	75.3	4,480		
July.....	2.43	.20	6	317	19	3.0	74.9	4,600		
August.....	2.59	.25	30	342	10	5.5	72.0	4,430		
September.....	3.22	.96	8	474	27	60.9	152	9,050		
October.....	1.72	.68	19	169	10	39.5	73.6	4,520		
November.....	1.50	.76	29	122	2	51.7	83.8	4,990		
December.....	1.49	.92	7	124	23	64.0	91.6	5,640		
Yearly.....	3.40	.20		530			3.0	141	102,420	2.97

\* Partly Estimated

## RIO GRANDE AT UPPER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located 1 mile from Haciendita, Texas, 8 miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Ojinaga, Chihuahua, and Presidio, Texas. Zero of gage is 2,570.40 feet above mean sea level, International Boundary Commission datum.

**Records:** Based on 15 meter measurements during the year. Computations by shifting channel methods. 1934 records fair.

**Records Available:** May, 1900 to Mar. 1914; Sept., 1919 to Mar. 1920; August, 1923 to Dec. 1934.

**Remarks:** River flow is greatly modified at this station by Elephant Butte reservoir and diversions for irrigation in both the United States and Mexico. With all closed basins eliminated, the drainage area above this station is 37,488 square miles, of which 35,229 are in the United States and 2,259 in Mexico. See correction for 1933 record on page 50 hereof.

**Previous Extreme Flows:** The greatest recorded flow was in August, 1928, with a peak of 11,250 second feet. The river is sometimes dry. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	303	154	332	200	7.5	176	0	0	*.50	0	0	0
2	290	154	363	225	22.3	*76.4	0	0	0	0	0	0
3	280	154	367	194	30.2	*49.3	0	0	10.4	0	0	0
4	258	156	341	164	15.4	*38.1	0	0	15.7	0	0	0
5	244	161	343	137	9.77	*34.0	0	2.33	17.1	0	0	0
6	236	153	315	122	9.13	*33.5	5.21	.34	11.8	0	0	0
7	255	149	318	120	10.6	*21.3	.84	0	8.3	0	0	0
8	211	151	378	95.4	9.76	*15.9	.45	0	24.2	0	0	0
9	205	153	404	91.9	7.57	*10.4	.20	0	32.1	0	0	0
10	200	153	381	83.0	5.98	*7.2	0	0	652.	0	0	0
11	188	155	339	68.0	5.14	*5.39	0	0	297	0	0	0
12	185	158	290	57.2	5.06	*0.62	0	0	138	0	0	0
13	188	259	250	51.3	4.36	0	0	0	82.9	0	0	.4
14	181	328	224	48.3	3.82	0	0	0	47.4	0	0	.4
15	177	353	205	46.9	3.88	0	0	0	29.3	0	0	4.2
16	172	372	190	53.5	4.24	0	0	0	25.6	0	0	6.1
17	173	427	186	87.8	3.33	0	0	0	31.0	0	0	7.2
18	170	432	182	50.8	4.67	0	0	0	38.9	0	0	7.6
19	169	413	175	33.3	5.03	0	0	0	36.8	0	0	9.4
20	168	387	169	31.9	5.09	0	0	0	27.7	0	0	11.2
21	162	362	152	16.6	3.95	0	0	0	21.8	0	0	11.2
22	165	347	136	13.3	* 3.76	0	0	0	12.3	0	0	11.2
23	162	375	137	11.9	* 3.57	0	0	0	6.5	0	0	11.2
24	159	405	133	9.8	* 3.19	0	0	0	6.1	0	0	11.2
25	153	419	127	* 7.61	* 2.69	0	0	0	4.2	0	0	11.7
26	147	400	132	† 7.21	16.3	0	0	106	2.6	0	0	13.6
27	145	384	136	† 7.72	206	0	0	907	.8	0	0	14.8
28	141	336	140	8.23	164	0	0	0	*57.0	.3	0	14.8
29	148	...	145	† 8.69	96.8	0	0	0	*12.7	0	0	15.7
30	142	...	143	† 8.74	88.2	0	0	0	* 7.0	0	0	13.6
31	154	...	157	...	144	0	0	0	* 1.0	0	0	12.9

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	1.73	1.12	1	312	26	137	190	11,700		
February.....	2.11	1.03	9	435	18	146	280	15,600		
March.....	2.14	1.04	9	418	25	126	235	14,500		
April.....	1.49	.14	2	230	25	7.16	68.7	4,090		
May.....	3.22	.10	27	907	25	2.05	29.2	1,800		
June.....	1.93	...	1	345	...	0	*15.6	*928		
July.....	.87	...	6	90.7	...	0	.22	13.3		
August.....	4.59	...	27	1,770	...	0	35.3	2,170		
September.....	3.88	...	10	1,260	...	0	52.7	3,140		
October.....	...	...	0	0	0	0	0	0		
November.....	...	...	0	0	0	0	0	0		
December.....	.41	...	27	15.7	...	0	6.08	374		
Yearly.....	4.59	....		1,770	....	0	75.0	54,315.3	1.45	

\* Partly Estimated

## RIO GRANDE AT LOWER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car and winch located about  $2\frac{1}{4}$  miles above the international highway bridge at Presidio, Texas, and  $1\frac{1}{2}$  miles below the confluence of the Rio Conchos with the Rio Grande. The 60 foot mark on the gage is 2,560 feet above mean sea level, International Boundary Commission datum.

**Records:** Based on 41 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** May, 1900 to July 1915; Sept., 1919 to Mar. 1920; August, 1923 to Dec. 1934.

**Remarks:** Station moved to its present location on June 14, 1932. The river flow is greatly modified by irrigation diversions and Elephant Butte reservoir in the United States, and by Boquilla reservoir on the Rio Conchos, as well as by irrigation diversions in Mexico. With all closed basins eliminated, the drainage area above this station is 60,109 square miles, of which 35,250 are in the United States and 24,859 in Mexico.

**Previous Extreme Flows:** The greatest recorded flow occurred in October, 1904, with a mean daily flow of 149,210 second feet. The lowest recorded flow was 3.5 second feet in May, 1904. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, #228 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*1,290	*1,330	1,520	1,020	834	1,150	929	1,210	676	634	804	557
2	*1,280	*1,250	1,430	1,130	890	983	* 848	990	807	662	667	636
3	*1,270	*1,250	1,360	1,150	803	1,070	* 896	1,100	1,110	589	892	676
4	*1,260	*1,260	1,350	1,030	739	1,080	* 916	972	1,150	725	1,080	762
5	*1,250	*1,260	1,340	948	640	942	* 868	856	894	835	1,190	893
6	*1,240	*1,260	1,410	865	700	1,210	* 953	1,150	615	621	1,160	710
7	*1,220	*1,150	1,250	866	567	1,120	* 936	1,000	655	559	853	797
8	*1,210	1,260	1,480	899	658	1,090	* 859	884	631	439	905	700
9	*1,200	1,270	1,370	851	652	1,030	* 906	880	642	502	881	834
10	*1,190	1,280	1,280	836	701	1,080	* 1,210	651	1,420	668	783	776
11	*1,180	1,170	1,200	813	811	1,030	874	584	1,430	568	819	724
12	*1,170	1,260	1,310	877	790	997	798	664	893	575	874	854
13	*1,200	1,320	1,240	846	744	988	940	657	603	525	911	678
14	*1,270	1,390	1,360	725	702	1,060	884	604	507	600	851	673
15	1,320	1,430	1,220	763	744	1,020	863	539	732	732	716	617
16	1,260	1,380	1,130	956	790	1,030	* 817	580	646	616	887	662
17	1,420	1,460	1,110	975	867	1,040	* 1,030	642	587	740	655	545
18	*1,280	1,650	1,090	1,110	740	1,020	* 939	564	536	656	567	676
19	*1,080	1,660	1,190	846	681	1,020	* 846	507	494	827	606	782
20	1,280	1,640	988	815	745	951	* 869	538	554	767	704	685
21	1,250	1,700	1,090	786	724	672	* 755	519	578	544	797	680
22	1,220	1,600	1,170	720	761	980	* 896	519	566	601	586	620
23	1,290	1,490	1,010	721	722	988	* 840	674	486	808	466	719
24	1,230	1,480	1,010	827	685	996	* 878	578	544	931	497	780
25	1,270	1,550	994	973	770	887	* 1,230	828	532	673	611	704
26	1,170	1,560	1,070	851	849	831	* 1,230	804	467	738	647	868
27	1,160	1,490	996	866	1,150	904	1,390	1,320	514	635	546	815
28	1,280	1,450	1,110	948	1,250	761	1,060	614	588	711	721	925
29	1,250	....	1,100	819	1,210	813	1,350	394	593	702	662	738
30	1,180	....	953	909	1,220	842	1,620	375	644	907	608	634
31	1,230	....	971	....	896	....	1,240	546	...	596	...	718

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Low	High		Low		Total	Per Sq. Mile	
	High	Low		Dates						
January.....	2.93	2.43	17	1,510	19	* 902	1,240	76,200		
February.....	3.21	2.45	21	1,800	11	1,020	1,400	77,900		
March.....	3.06	2.22	1	1,620	31	808	1,200	73,600		
April.....	2.68	1.93	18	1,220	22	616	891	53,000		
May.....	4.07	1.81	27	* 2,990	8	541	808	49,700		
June.....	2.76	1.83	1	1,340	21	588	986	58,700		
July.....	3.20	1.85	25	1,800	21	591	989	60,800		
August.....	3.54	1.46	6	2,260	30	302	736	45,200		
September.....	3.41	1.54	10	2,130	24	475	703	41,800		
October.....	2.42	1.46	24	1,090	8	420	667	41,000		
November.....	2.63	1.41	5	1,240	23	428	765	45,500		
December.....	2.38	1.39	5	1,010	17	503	724	44,500		
Yearly.....	4.07	1.39	...	*2,990	...	302	923	667,900	11.1	

\* Partly Estimated

## ALAMITO CREEK STATION NEAR PRESIDIO, TEXAS

**Description:** Automatic water-stage recorder, about 1,000 feet above confluence with the Rio Grande, and 6 miles below Presidio, Texas. Zero of gage is 2,545.00 feet above mean sea level, International Boundary Commission datum.

**Records:** Based upon 4 meter measurements and previous rating curve, and by numerous estimates by the hydrographer at low flow. 1934 records fair.

**Records Available:** January 1, 1932 to December 31, 1934.

**Remarks:** The flow of this spring fed creek is modified by a small irrigation diversion  $\frac{1}{4}$  mile above the station. The low flow is steady, being from springs. The high flow is erratic, being from storms. The drainage area above this station is 1,504 square miles all in the United States.

**Previous Extreme Flows:** The greatest recorded flow occurred Sept. 6, 1932, with a gage height of 5.93 feet and flow of 5,680 second feet. The lowest recorded flow was .87 second foot on several days in 1932. On Oct. 2, 1932, backwater from the Rio Grande caused a gage height of 8.33 feet.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.0	3.0	3.0	3.0	3.0	* 6.2	3.0	3.0	* 3.0	3.0	2.0	2.0
2	3.0	3.0	3.0	3.0	52.1	* 3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
3	3.0	3.0	3.0	3.0	3.0	* 16.4	3.0	3.0	* 3.0	3.0	2.0	2.0
4	3.0	3.0	3.0	3.0	3.0	* 3.5	3.0	148	* 3.0	3.0	2.0	2.0
5	3.0	3.0	3.0	3.0	3.0	* 3.5	3.0	94.4	* 3.0	3.0	2.0	2.0
6	3.0	3.0	3.0	3.0	3.0	3.0	3.0	15.5	* 3.0	3.0	2.0	2.0
7	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
8	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
11	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
12	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
13	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
14	3.0	3.0	3.0	3.0	* 4.1	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
16	3.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	* 3.0	3.0	2.0	2.0
17	3.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	* 3.0	3.0	2.0	2.0
18	3.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	* 3.0	3.0	2.0	2.0
19	3.0	3.0	3.0	3.0	3.0	2.5	5.7	3.0	* 3.0	3.0	2.0	2.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
21	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	3.0	2.0	2.0
22	3.0	3.0	3.0	3.0	3.0	3.0	6.1	3.0	* 3.0	3.0	2.0	2.0
23	3.0	3.0	3.0	3.0	3.0	3.0	48.9	3.0	* 3.0	3.0	2.0	2.0
24	3.0	3.0	3.0	3.0	3.0	3.0	37.5	14.8	* 3.0	2.0	2.0	2.0
25	3.0	3.0	3.0	3.0	3.0	3.0	5.0	1,610	* 3.0	2.0	2.0	2.0
26	3.0	3.0	3.0	3.0	* 6.1	3.0	3.0	8.2	* 3.0	2.0	2.0	2.0
27	3.0	3.0	3.0	3.0	* 160	3.0	3.0	3.0	* 3.0	2.0	2.0	2.0
28	3.0	3.0	3.0	3.0	*	8.2	3.0	3.0	* 3.0	2.0	2.0	2.0
29	3.0	....	3.0	3.0	3.0	3.0	3.0	3.0	* 3.0	2.0	2.0	2.0
30	3.0	....	3.0	9.47	3.0	3.0	3.0	3.0	* 3.0	2.0	2.0	2.0
31	3.0	....	3.0	....	3.0	....	3.0	3.0	....	2.0	....	2.0

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Low	High		Low		Total	Per Sq. Mile	
	High	Low		Dates						
January.....	....	....			3.0		3.0	3.0	184	
February.....	....	....			3.0		3.0	3.0	137	
March.....	....	....			3.0		3.0	184		
April.....	1.73	....	30		59.0		3.0	3.22	191	
May.....	4.68	....	27	*5,000			3.0	10.0	612	
June.....	1.88	....	3	*390		2.0		3.47	206	
July.....	1.00	....	23	295			3.0	* 5.85	*359	
August.....	4.04	....	25	8,200			3.0	*63.4	*4,000	
September.....	....	....			3.0		3.0	* 3.0	* 179	
October.....	....	....			3.0		2.0	2.68	165	
November.....	....	....			2.0		2.0	2.0	119	
December.....	....	....			3.0		2.0	2.1	131	
Yearly.....	4.68	....		8,200			2.0	8.97	6,497	
									4.32	

\* Partly Estimated

## TERLINGUA CREEK STATION NEAR TERLINGUA, TEXAS

**Description:** Automatic water-stage recorder and cable with sit down cable car located about 12 miles south of Terlingua, Texas, and  $2\frac{1}{2}$  miles above the confluence with the Rio Grande at the lower end of Santa Helena Canyon. Zero of gage is 2,191.04±.5 feet above mean sea level, United States Geological Survey datum.

**Records:** Based upon 22 meter measurements, and previous rating curve. 1934 records fair.

**Records Available:** January 1, 1932 to December 31, 1934.

**Remarks:** The flow of this spring fed creek is modified by small irrigation diversions above the station. The low flow is steady, being from springs. The high flows are erratic, being from storms. The drainage area above this station is 1,070 square miles, all in the United States.

**Previous Extreme Flows:** The greatest recorded flow was on May 28, 1932, when the extreme gage height was 15.30 feet, with a discharge of 24,080 second feet. The lowest flow recorded was in May, 1932, when the discharge was 1.0 second foot for several days.

*Mean Daily Discharge in Second Feet and Annual Summary, 1934*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.0	2.0	2.0	1.0	1.0	*27.1	1.6	*5.2	20.1	1.0	1.1	1.1
2	3.0	2.0	2.0	1.0	1.0	*1.3	1.6	*5.2	7.7	1.0	1.1	1.1
3	3.0	2.0	2.0	1.0	1.0	*1.0	1.6	*5.2	4.3	1.0	1.1	1.1
4	3.0	2.0	2.0	1.0	1.0	*134	1.6	*5.2	3.2	1.0	1.1	1.3
5	3.0	2.0	2.0	1.0	1.0	*491	1.2	*24.6	2.6	1.0	1.1	1.2
6	3.0	2.0	2.0	1.1	1.0	81.0	17.1	*1.7	1.9	1.0	1.1	1.2
7	3.0	2.0	2.0	1.1	1.0	*1.5	*5.0	*1.7	1.2	1.0	1.1	1.3
8	3.0	2.0	2.0	1.1	.75	*1.1	*1.4	*1.7	1.0	1.0	1.1	1.3
9	3.0	2.0	2.0	1.1	.75	*1.1	.8	*1.7	90.9	1.0	1.1	1.2
10	3.0	2.0	1.5	1.2	.75	*1.1	.7	*1.7	17.5	0.7	1.2	1.2
11	3.0	2.0	1.5	1.2	.75	*1.0	.5	*1.7	13.4	0.7	1.1	1.1
12	3.0	2.0	1.5	1.2	.75	*1.0	.6	*1.7	12.7	0.8	1.1	1.3
13	3.0	2.0	1.4	1.3	.75	*1.0	.7	*1.7	11.4	0.7	1.0	1.3
14	3.0	2.0	1.4	1.3	.75	*1.0	.7	*1.7	507	0.8	1.1	1.3
15	3.0	2.0	1.4	1.3	.75	*1.0	443	*1.7	73.0	0.8	1.1	1.4
16	3.0	2.0	1.3	1.3	.75	*1.0	80.8	*1.7	14.4	0.7	1.0	1.5
17	3.0	2.0	1.3	1.2	.75	*1.0	4.0	*1.7	4.4	0.8	1.0	1.9
18	2.0	2.0	1.2	1.2	.75	*1.0	3.0	*1.7	1.9	0.8	1.0	1.8
19	2.0	2.0	1.2	1.2	.75	*1.0	3.0	*1.7	1.5	0.7	1.0	1.8
20	2.0	2.0	1.2	1.2	.75	*1.0	3.0	*1.7	1.2	0.7	1.0	1.6
21	2.0	2.0	1.2	1.1	.75	*1.0	3.9	*1.7	1.1	0.6	1.0	1.8
22	2.0	2.0	1.2	1.1	.75	*1.1	31.00	*1.7	*1.0	0.7	1.0	1.8
23	2.0	2.0	1.1	1.1	.75	*88.8	3.7	5.5	*1.0	0.6	1.1	1.8
24	2.0	2.0	1.1	1.1	.75	*259	3.5	10.7	*1.0	0.6	1.1	1.5
25	2.0	2.0	1.1	1.1	8.24	*42.8	3.3	4.4	*1.0	0.6	1.1	1.8
26	2.0	2.0	1.1	1.1	13.5	*8.3	138	2.8	*1.0	0.6	1.1	1.6
27	2.0	2.0	1.0	1.1	3.0	*1.9	22	1.9	*1.0	0.9	1.2	1.8
28	2.0	2.0	1.0	1.0	1.26	*1.6	*5.2	1.3	*1.0	1.1	1.2	1.3
29	2.0	...	1.0	1.0	.76	*1.6	*5.2	9.3	*1.0	1.0	1.2	1.3
30	2.0	...	1.0	1.0	1.00	*1.6	*5.2	9.3	*1.0	0.9	1.2	1.9
31	2.0	...	1.0	...	11.3	...	*5.2	8.8	...	0.8	...	1.8

Month	Extreme Gage Height—Feet	Extreme Second Feet				Second Average Feet	Low		
		High		Low			Total	Per Sq. Mile	
		High	Low	Dates	Dates				
January.....	....	....	....		3.0	2.0	2.55	157	
February.....	....	....	....		2.0	2.0	2.00	111	
March.....	....	....	....		2.0	1.0	1.44	88.7	
April.....	....	....	....		1.3	1.0	1.12	66.8	
May.....	4.30	....	....	31	485	.75	1.90	117	
June.....	12.32	....	....	5	*11,300	1.0	38.6	2,300	
July.....	8.30	.84	....	15	5,070	.45	25.7	1,580	
August.....	3.35	1.04	....	5	320	.70	4.14	254	
September.....	4.89	*1.26	....	14	1,300	29	*1.0	26.7	
October.....	1.33	1.24	....	29	1.2	20	0.5	.83	
November.....	1.33	1.27	....	10	1.3	20	0.8	1.1	
December.....	1.43	1.26	....	26	3.6	2	0.9	1.5	
Yearly.....	12.32	.84	....		*11,300		.45	8.94	
								6,470.2	
								6.05	

\* Partly Estimated

## RIO GRANDE AT BOQUILLAS STATION

**Description:** Automatic water-stage recorder and cable with stand up cable car and winch located 4 miles below mouth of Tornillo Creek and a quarter of a mile east of Boquillas, Brewster County, Texas. Zero of gage is 1,802.73 feet above mean sea level United States Geological Survey datum.

**Records:** Based on 25 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** From June, 1928 to December, 1934.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte reservoir in the United States, and by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 69,373 square miles; 39,734 being in the United States and 29,639 in Mexico.

**Previous Extreme Flows:** The greatest recorded flow was on Oct. 4, 1932, when the extreme gage height was 24.50 feet and the extreme flow was 95,030 second feet. An extreme gage height of 32.4 was reported by local residents to have occurred in September, 1904, discharge unknown. The lowest flow ever recorded was on September 29, 1930, when the extreme gage height was 0.35 foot and the extreme flow was 123 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	1,310	1,310	1,550	1,060	1,250	*1,450	923	*1,630	767	565	833	661	
2	*1,350	1,260	1,490	992	*3,610	2,010	902	*1,450	708	575	784	617	
3	*1,360	1,360	1,550	951	*1,520	2,230	846	*1,540	861	553	723	559	
4	*1,330	1,380	1,470	942	*1,090	*1,700	819	2,020	790	546	782	565	
5	*1,380	1,290	1,360	*1,030	*1,010	*1,950	794	1,540	847	550	760	603	
6	*1,360	1,290	1,320	1,080	*	989	*2,500	930	1,540	1,040	517	945	655
7	1,350	1,320	1,290	982	949	*1,570	866	1,250	950	648	1,030	805	
8	1,380	1,310	1,600	929	909	*1,260	891	1,270	802	620	1,060	744	
9	*1,350	1,350	1,350	848	877	1,360	954	1,160	743	573	929	692	
10	*1,350	1,250	1,390	800	*	750	*1,160	841	1,000	781	553	803	740
11	*1,400	1,370	1,420	802	801	1,050	839	892	729	508	877	695	
12	1,340	1,340	1,360	805	785	1,030	1,020	831	804	513	775	736	
13	1,310	1,230	1,260	883	809	1,030	1,050	738	1,310	578	751	711	
14	1,310	1,250	1,330	1,170	884	1,010	747	708	966	562	727	732	
15	*1,340	1,320	1,380	968	1,170	1,030	801	744	1,230	566	820	741	
16	*1,380	1,460	1,330	874	907	*	982	1,640	755	814	*575	781	650
17	1,370	1,500	1,330	900	818	*	950	1,160	666	644	*633	703	645
18	1,330	1,500	1,400	1,100	808	950	882	600	662	*695	740	628	
19	1,340	1,560	1,140	1,100	834	965	881	584	619	*659	729	623	
20	*1,250	1,680	1,110	1,100	874	*	956	985	600	563	*668	621	564
21	*1,150	1,740	1,140	939	814	955	737	597	522	*710	593	644	
22	*1,250	1,740	1,160	857	776	963	836	641	506	*765	613	671	
23	1,250	1,800	1,080	827	808	830	1,420	634	505	699	681	629	
24	1,250	1,710	1,310	818	798	1,020	1,510	612	509	624	677	618	
25	1,310	1,580	1,240	781	837	1,350	*1,080	685	624	630	583	589	
26	1,370	1,640	1,040	765	778	1,170	*1,440	1,450	530	820	536	664	
27	1,400	1,600	1,160	941	754	944	*5,430	1,500	535	768	537	684	
28	1,360	1,650	1,060	888	2,540	928	*2,020	1,070	532	733	588	686	
29	1,280	---	1,060	829	1,250	934	*1,500	1,290	530	720	595	746	
30	1,350	---	1,040	847	1,350	927	*1,400	1,060	540	700	565	782	
31	1,360	---	1,080	---	*1,380	---	*1,400	859	...	725	---	811	

Month	Extreme Gage Height—Feet			Extreme Second Feet				Average Second Feet	Acre Feet		
	High		Low	High		Low			Total	Per Sq. Mile	
	High	Low		Dates		Dates					
January.....	2.02	1.80	26	1,470	23	1,200	1,330	81,800			
February.....	2.32	1.74	23	1,880	13	1,160	1,460	81,000			
March.....	2.34	1.60	18	1,920	26	1,010	1,280	78,900			
April.....	2.01	1.26	13	1,540	26	729	927	55,200			
May.....	5.48	1.27	2	6,220	10	718	1,090	66,900			
June.....	5.91	1.65	3	7,020	30	919	1,240	73,700			
July.....	6.62	1.37	27	9,300	21	682	1,210	74,500			
August.....	4.80	1.12	4	5,200	19	566	1,030	63,300			
September.....	2.21	1.20	13	1,400	22	500	732	43,600			
October.....	1.50	1.08	26	872	3	474	632	38,900			
November.....	1.79	1.08	8	1,080	26	530	738	43,900			
December.....	1.64	1.07	7	922	20	559	675	41,500			
Yearly.....	6.62	1.07		9,300		474	1,030	743,200		10.7	

\* Partly Estimated

## LOZIER CREEK STATION NEAR LANGTRY, TEXAS

**Description:** Automatic water-stage recorder and cable with sit down cable car located 21 miles west of Langtry, Texas, and about 1 mile above the confluence with the Rio Grande.

**Records:** Based upon previous rating curve. 1934 records poor.

**Records Available:** January 1, 1932 to December 31, 1934.

**Remarks:** This creek is dry except during storms. The drainage area above this station is 1,728 square miles, all in the United States.

*Mean Daily Discharge in Second Feet and Annual Summary, 1926-1934*

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	...	...		0		0	0	0		
February.....	...	...		0		0	0	0		
March.....				0		0	0	0		
April.....	7.05	...	19	510		0	8.16	485		
May.....	6.57	...	4	370		0	2.07	123		
June.....				0		0	0	0		
July.....				0		0	0	0		
August.....				0		0	0	0		
September.....				0		0	0	0		
October.....				0		0	0	0		
November.....				0		0	0	0		
December.....				0		0	0	0		
Yearly.....	7.05	...		510		0	.84	608	.35	

## RIO GRANDE AT LANGTRY STATION

**Description:** Automatic water-stage recorder and cable with stand up cable car and winch located at Langtry, Val Verde County, Texas. Zero of gage is 1,091.69 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 23 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** May, 1900 to October, 1914; December, 1919 to March, 1920; and January, 1924 to December, 1934.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte reservoir in the United States, also by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 77,518 square miles; 45,779 being in the United States and 31,739 in Mexico.

**Previous Extreme Flows:** The greatest recorded flow was on September 16, 1919, when the extreme gage height was 46.9 feet and the extreme flow was estimated by float measurement to be 152,000 second feet. An extreme gage height of 56.9 feet was reported on June 18, 1922, discharge unknown. The lowest flow ever recorded was in May, 1903 with an extreme of 270 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,670	1,620	1,860	1,250	*1,150	1,460	1,130	1,500	1,320	789	958	890
2	1,520	1,620	1,860	1,300	*2,200	1,760	1,060	1,470	1,120	778	987	861
3	1,640	1,600	1,810	1,280	*3,000	2,540	1,070	1,760	1,140	851	1,020	900
4	1,640	1,570	1,760	1,160	*2,100	3,210	1,150	1,590	937	859	1,080	940
5	1,610	1,650	1,790	1,200	*1,600	5,350	1,160	1,540	987	886	964	880
6	1,630	1,640	1,750	1,240	*1,500	2,200	1,130	2,210	1,030	893	1,040	891
7	1,660	1,580	1,700	1,320	*1,400	2,290	1,080	1,590	1,030	901	1,010	862
8	1,640	1,600	1,640	1,300	*1,270	2,970	1,170	1,590	1,250	870	1,180	921
9	1,620	1,610	1,610	1,210	*1,190	1,700	1,160	1,370	1,270	906	1,330	1,020
10	1,550	1,590	1,660	1,180	*1,100	1,430	1,170	1,380	1,110	1,010	1,400	1,120
11	1,560	1,620	1,590	1,120	*1,010	1,570	1,230	1,360	1,010	912	1,310	1,010
12	1,620	1,550	1,670	1,140	* 950	1,420	1,140	1,280	1,030	869	1,130	1,040
13	1,760	1,600	1,670	1,130	* 985	1,360	1,120	1,200	988	809	1,190	1,010
14	1,700	1,620	1,620	1,150	*1,010	1,300	1,230	1,170	1,010	769	1,140	1,070
15	1,610	1,520	1,540	1,290	*1,060	1,280	1,370	1,040	1,550	833	1,070	1,060
16	1,520	1,550	1,570	1,480	*1,110	1,270	1,100	968	1,320	880	1,040	1,040
17	1,590	1,600	1,610	1,290	*1,280	1,260	1,080	955	1,470	849	1,090	1,120
18	1,600	1,700	1,580	1,200	*1,130	1,240	1,940	1,050	1,260	846	1,120	1,000
19	1,640	1,720	1,470	1,600	*1,010	1,240	1,540	958	986	873	1,070	953
20	1,610	1,700	1,450	1,330	*1,030	1,240	1,240	886	1,000	960	1,010	904
21	1,680	1,760	1,400	1,270	*1,050	1,240	1,230	864	1,560	897	1,070	924
22	1,650	1,910	1,380	1,280	1,120	1,230	1,400	880	1,030	935	965	865
23	1,510	1,960	1,410	1,300	2,270	1,210	1,160	858	972	915	884	845
24	1,580	1,980	1,410	1,160	1,570	1,220	1,180	815	946	996	898	975
25	1,650	2,030	1,350	1,120	1,290	1,190	1,940	1,100	911	976	952	935
26	1,630	1,920	1,380	1,090	1,120	1,570	1,890	818	836	868	1,010	915
27	1,660	1,790	1,350	1,050	1,050	1,580	1,640	787	948	839	930	915
28	1,660	1,800	1,230	1,010	1,000	1,460	4,720	1,870	835	998	840	916
29	1,670	....	1,240	1,080	1,280	1,220	3,230	1,750	810	1,070	811	996
30	1,630	....	1,280	1,200	3,020	1,110	1,850	1,320	824	889	820	956
31	1,560	....	1,280	....	1,880	....	1,690	1,440	....	1,010	....	1,060

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	1.93	1.64	13	1,820	23	1,480	1,620	99,700		
February.....	2.18	1.66	25	2,060	15	1,480	1,690	94,000		
March.....	2.04	1.46	1	1,890	28	1,200	1,550	95,000		
April.....	2.35	1.17	19	2,350	28	1,000	1,220	72,900		
May.....	4.82	1.07	3	6,440	29	932	1,410	86,700		
June.....	4.81	1.26	4	6,440	30	1,090	1,700	101,000		
July.....	5.33	1.18	28	7,430	3	1,000	1,490	91,600		
August.....	2.80	.94	6	3,000	27	767	1,270	78,100		
September.....	2.74	.94	21	2,900	28	796	1,080	64,400		
October.....	1.30	.92	29	1,120	14	759	898	55,200		
November.....	1.53	1.01	10	1,400	29	801	1,040	62,100		
December.....	1.36	1.01	10	1,160	23	806	961	59,100		
Yearly.....	5.33	.92		7,430		759	1,330	959,800	12.4	

\* Partly Estimated

## PECOS RIVER STATION NEAR COMSTOCK, TEXAS

**Description:** Staff-gage and cable with sit down cable car and winch located at the Pecos high bridge of the Southern Pacific Railroad 12 miles northwest of Comstock, Val Verde County, Texas, and 5½ miles above the confluence with the Rio Grande. Zero of gage is 1,058.01 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 16 meter measurements during the year. Staff-gage read twice daily and more frequently during large changes of stage. Computations by shifting channel methods. 1934 records good.

**Records Available:** Mar. 17, 1898 to Dec. 3, 1898 and May, 1900 to December, 1934.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and by the reservoirs of the Carlsbad irrigation project in New Mexico. With all closed basins eliminated the drainage area above this station is 38,283 square miles, all in the United States.

**Previous Extreme Flows:** The greatest recorded flow was on September 1, 1932, when the extreme gage height was 38.25 feet and the extreme flow was 101,800 second feet. An extreme gage height of 35.75 feet was reported on April 6, 1900, discharge based upon 1932 rating curve was 95,200 second feet. The lowest flow ever recorded was on August 31, 1930, when the extreme gage height was -0.15 foot and the extreme flow was 07 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	346	348	282	238	230	192	150	171	156	151	159	188
2	334	335	277	231	308	190	157	168	150	147	166	182
3	333	328	276	231	252	192	162	166	156	143	166	188
4	337	327	268	231	230	*3,300	162	164	156	141	171	188
5	325	327	272	232	224	*4,470	164	164	155	147	166	188
6	332	318	274	323	218	*1,120	162	159	149	151	166	182
7	324	318	266	243	221	662	157	155	147	149	162	201
8	323	317	266	240	212	441	162	151	147	152	166	196
9	323	310	263	241	201	367	158	151	142	157	166	204
10	326	309	266	241	197	340	158	151	140	154	166	201
11	329	300	273	241	191	302	158	147	138	157	166	199
12	332	308	266	235	191	283	154	151	137	154	166	193
13	332	308	259	229	191	268	154	148	141	152	166	199
14	331	301	252	233	191	255	153	146	141	157	169	199
15	334	292	252	230	190	231	153	146	226	157	171	199
16	330	292	252	230	190	221	149	144	154	152	174	199
17	325	285	246	234	190	201	145	144	152	162	176	204
18	322	285	239	237	190	192	144	143	144	157	174	207
19	310	284	239	1,700	192	194	142	141	148	162	181	198
20	306	284	239	409	190	190	142	141	147	157	209	203
21	302	284	248	387	192	189	143	141	141	157	176	198
22	291	280	245	309	192	184	143	141	145	150	171	203
23	294	269	241	259	190	183	151	145	143	157	176	203
24	289	282	255	240	190	180	1,080	146	147	157	176	198
25	286	274	283	234	248	174	476	146	147	162	181	198
26	310	274	265	229	342	171	317	142	147	154	176	206
27	330	266	258	216	283	166	260	148	147	159	181	215
28	338	279	251	210	245	161	219	153	143	162	181	206
29	338	...	251	210	220	161	199	153	143	162	181	203
30	341	...	245	211	211	161	199	155	153	157	181	209
31	333	...	238	...	201	...	188	155	...	157	...	215

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	.64	.48	1	353	25	282	323	19,900		
February.....	.68	.48	1	351	27	266	300	16,600		
March.....	.56	.42	25	287	21	238	258	15,900		
April.....	5.10	.29	19	4,250	30	208	295	17,500		
May.....	.70	.21	26	353	12	189	217	13,300		
June.....	7.50	.11	4	8,220	30	158	513	30,600		
July.....	3.06	.03	24	1,900	22	141	209	12,800		
August.....	.18	.01	1	173	22	139	151	9,270		
September.....	.52	.02	15	274	12	137	149	8,890		
October.....	.15	.05	29	164	4	141	155	9,520		
November.....	.36	.12	20	222	1	157	173	10,300		
December.....	.34	.21	27	215	6	180	199	12,200		
Yearly.....	7.50	.01		8,220			137	244	176,780	
									4.62	

\* Partly Estimated

## GOODENOUGH SPRING STATION NEAR COMSTOCK, TEXAS

**Description:** Automatic water-stage recorder located  $\frac{1}{2}$  mile above confluence with Rio Grande and 11  $\frac{3}{4}$  miles southwest of Comstock, Val Verde County, Texas.

**Records:** Based upon 12 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** February, 1929 to December, 1934.

**Remarks:** The flow of this spring channel is very uniform and is not modified by diversions or storage. The surface drainage area above this station is one square mile, all in the United States.

**Previous Extreme Flows:** The highest recorded gage height was on Sept. 1, 1932, when the extreme gage height was 17.30 feet, discharge unknown. The lowest flow ever recorded was on April 4, 1930, when the extreme gage height was 0.27 foot and the extreme flow was 93 second feet.

*Mean Daily Discharge in Second Feet and Annual Summary, 1934*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	211	195	182	171	167	164	156	190	171	166	161	151
2	211	195	181	169	164	164	156	186	141	166	161	151
3	209	195	182	170	165	165	156	182	171	166	160	149
4	209	192	180	170	166	165	156	180	170	165	159	148
5	208	192	180	170	166	164	156	179	170	163	158	149
6	208	192	179	169	165	164	153	176	170	163	158	149
7	207	194	179	169	165	162	153	175	171	162	158	149
8	205	193	178	168	164	163	153	175	171	162	158	152
9	204	190	178	169	163	162	152	174	171	162	157	152
10	205	190	176	170	162	162	152	173	171	161	158	149
11	205	189	175	169	161	162	151	173	171	161	158	149
12	204	189	175	168	164	163	151	172	171	162	157	149
13	204	187	175	169	170	163	151	172	171	162	157	150
14	204	188	174	171	169	163	151	172	171	162	157	150
15	204	188	175	170	168	162	151	172	170	162	157	150
16	202	187	175	169	167	162	151	173	170	162	157	150
17	202	187	174	169	166	161	151	171	170	162	157	150
18	202	186	173	170	166	160	151	171	169	162	156	149
19	202	184	174	168	166	160	149	171	170	162	156	149
20	202	184	173	168	164	160	149	171	168	162	158	149
21	202	184	173	167	165	161	149	171	168	162	156	148
22	201	184	173	168	164	160	149	171	169	162	155	147
23	201	183	172	168	164	160	150	171	168	162	156	148
24	201	183	172	167	163	159	150	171	168	160	157	147
25	199	183	171	166	164	159	150	171	168	160	156	147
26	197	182	170	165	164	159	154	171	168	160	156	147
27	197	181	169	164	163	158	181	172	168	160	153	146
28	197	181	169	164	163	158	193	172	168	160	154	146
29	197	...	169	164	164	158	197	172	168	160	152	144
30	196	...	169	162	164	156	199	172	166	161	151	143
31	196	...	169	...	164	...	197	171	161	...	161	...

Month	Extreme Gage Height—Feet	Extreme Second Feet						Average Second Feet	Acre Feet	
		High			Low				Total	Per Sq. Mile
	High	Low	Dates		Dates					
January.....	1.23	1.12	1	212	30	195	203	12,500		
February.....	1.13	1.04	1	196	23	180	188	10,400		
March.....	1.07	.96	2	183	27	168	175	10,700		
April.....	1.22	.92	18	202	30	162	168	10,000		
May.....	1.72	.91	1	270	1	160	165	10,100		
June.....	.95	.80	3	166	29	150	161	9,600		
July.....	1.26	.81	30	202	22	148	159	9,750		
August.....	1.20	1.00	1	194	26	169	174	10,700		
September.....	1.11	.96	3	183	30	165	170	10,100		
October.....	.98	.91	1	168	25	159	162	9,960		
November.....	.93	.80	2	163	30	150	157	9,330		
December.....	.84	.72	6	156	31	139	148	9,120		
Yearly.....	1.72	.72		270			139	169	122,260	122,260

## DEVILS RIVER STATION NEAR DEL RIO, TEXAS

**Description:** Automatic water-stage recorder on main highway bridge, 12 miles northwest of Del Rio. High stage measurements from highway bridge, low stage measurements by wading. Zero of gage is 951.80 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 16 meter measurements, during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** May, 1900 to March, 1914, at a point .8 mile below Southern Pacific R. R. Bridge; December, 1923 to Sept. 1, 1932 at a point .2 mile above S. P. R. R. Bridge; Sept. 2, 1932 to Dec. 31, 1934 at highway bridge 2 miles upstream from R. R. bridge.

**Remarks:** The monthly flow of this spring fed river is not modified, but the hourly flow is modified by 2 power dams. The drainage area above this station is 4,060 square miles, all in the United States.

**Previous Extreme Flows:** The highest recorded gage height was on Sept. 1, 1932, when the extreme gage height was 48.40 feet and an extreme flow was 557,000 second feet. This flood flow of 138 second feet per square mile of water shed is the greatest ever recorded in North America for drainage areas of from 1 to 10 thousand square miles.\*\* The lowest flow ever recorded was on April 20, 1933 when the extreme gage height was .35 foot and the extreme flow 25 second feet. Numerous records of previous extreme flows may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	351	306	335	292	338	315	349	338	306	*293	280	281
2	350	294	334	334	562	895	337	281	264	*293	297	226
3	360	294	324	375	335	728	367	294	*765	*276	260	269
4	339	305	303	375	293	457	341	321	280	*324	222	291
5	350	315	313	312	293	2,070	357	277	266	*335	253	291
6	370	325	323	311	236	1,080	359	304	267	*335	292	279
7	350	336	332	301	272	671	347	289	295	*276	278	322
8	328	347	450	251	304	563	265	288	282	*303	286	293
9	307	316	321	310	*304	534	323	273	283	*303	277	257
10	307	337	321	278	305	534	339	272	241	*293	283	289
11	307	327	262	*351	305	344	341	299	326	*388	230	275
12	285	308	278	309	305	377	343	228	349	*335	257	272
13	307	319	383	319	238	403	373	283	344	*345	252	251
14	317	320	372	308	316	389	372	296	405	*303	218	260
15	327	330	260	249	306	387	259	309	*431	*284	217	265
16	359	331	309	286	306	360	328	294	*357	*335	281	193
17	369	354	355	328	297	286	383	292	*352	576	289	234
18	483	385	254	327	297	370	353	277	*347	288	218	313
19	349	355	286	585	297	335	310	234	*342	298	287	298
20	349	324	317	710	233	334	323	261	*337	323	301	268
21	358	335	317	529	276	353	322	316	*332	272	331	265
22	348	316	349	316	308	331	279	343	*327	295	248	271
23	337	316	358	250	298	298	320	272	*322	298	348	204
24	348	337	348	315	307	296	319	287	*317	263	269	218
25	348	306	348	304	297	295	346	287	*312	262	200	193
26	348	326	430	304	286	347	373	260	*307	289	245	265
27	348	326	357	313	296	345	371	303	*335	280	275	251
28	348	335	346	303	296	323	370	331	*345	227	274	234
29	295	...	346	236	336	314	313	318	*314	250	261	247
30	326	...	366	292	315	315	340	304	*284	284	275	194
31	337	...	365	...	305	...	339	291	...	286	...	243

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
	High		Low		High			Total	Per Sq. Mile	
	High	Low	Dates	Dates						
January.....	1.50	1.04	23	664	12	151	342	21,000		
February.....	1.51	1.07	19	690	3	169	326	18,100		
March.....	1.59	1.07	17	834	18	172	334	20,600		
April.....	1.65	1.03	19	952	16	135	336	20,000		
May.....	1.55	.99	1	744	20	110	305	18,800		
June.....	3.24	1.10	5	3,420	2	178	488	29,100		
July.....	1.44	1.12	28	593	16	156	337	20,700		
August.....	1.42	1.13	22	538	9	143	291	17,900		
September.....	2.47	1.14	3	2,120	11	155	334	19,900		
October.....	2.13	*1.03	17	2,670	10	*164	*317	19,500		
November.....	1.47	1.01	23	642	19	151	267	15,900		
December.....	1.55	.97	18	788	28	130	258	15,900		
Yearly.....	3.24	.97		3,420		110	328	237,400	58.5	

\*\* See Special Flood Report 1932 by United States Section of this Commission.

\* Partly Estimated

## CIENEGAS CREEK STATION NEAR DEL RIO, TEXAS

**Description:** Automatic water-stage recorder, located 900 feet above confluence with Rio Grande, 3 miles southwest of Del Rio, Texas, and 1½ mile above the Del Rio gaging station on the Rio Grande.

**Records:** Based upon 10 meter measurements and area-slope computations at high stages. Computations by averaging discharge between measurements prior to April 28 when automatic record began. 1934 records fair.

**Records Available:** September 1, 1931 to December 31, 1934.

**Remarks:** The flow of this spring fed creek is modified by diversions for irrigation above this station. The drainage area above this station is 18 square miles, all in the United States.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				5.33	17.6	3.22	2.45	2.5	2.1	*1.9	2.7	2.5
2				5.33	136.	3.22	2.45	2.7	2.2	*1.9	2.6	2.4
3		7.92			7.65	3.10	2.26	2.6	*512	*1.9	2.7	2.4
4					6.39	3.01	2.17	2.7	*2.8	*1.9	2.8	2.3
5					5.81	4.96	2.36	2.7	*2.7	*1.9	3.1	2.5
6	9.48				5.64	3.10	2.36	2.7	*2.8	*1.9	3.2	2.6
7					5.48	2.91	2.36	2.8	*2.8	1.9	3.2	2.6
8					5.64	2.91	2.45	2.8	*2.8	1.9	3.2	2.8
9					5.48	2.91	2.45	2.8	*2.8	2.4	3.2	2.8
10					5.48	2.82	2.45	2.8	*2.8	2.5	3.1	2.8
11			5.33		5.48	2.91	2.54	2.7	*2.8	2.0	3.0	2.8
12					5.32	2.82	2.54	2.9	*2.8	*2.1	2.9	2.8
13					3.97	2.82	2.54	3.1	*2.8	*2.1	2.8	2.8
14					3.35	2.73	2.54	3.2	*54.0	*2.1	2.8	2.6
15					3.35	2.64	2.54	3.3	*5.0	*2.1	2.8	2.5
16				*4.32	3.35	2.73	2.73	3.4	*3.5	*2.1	2.7	2.5
17			5.33		3.22	2.73	2.54	3.4	*3.7	*309.	2.7	2.5
18					3.22	2.73	2.45	3.4	*3.2	*4.0	2.8	2.6
19					3.84	2.64	2.45	3.3	*2.9	*2.4	2.9	2.6
20					4.83	2.64	2.45	3.1	*2.8	*2.2	2.9	2.8
21	7.92				3.72	2.64	2.17	2.8	*2.7	*2.3	2.9	2.8
22					3.47	*2.54	2.45	2.7	*2.6	*2.6	3.0	2.8
23					3.47	*2.54	2.54	2.6	*2.5	*2.8	3.0	2.7
24					3.60	2.45	2.54	2.5	*2.4	*3.0	2.9	2.7
25					3.60	2.45	2.54	2.3	*2.4	*3.3	2.9	2.7
26					3.47	2.45	5.31	2.2	*2.4	*3.6	2.9	2.7
27					3.35	2.45	2.73	2.1	*2.3	*2.9	2.8	2.7
28			V		4.83	3.47	2.45	2.64	1.9	*2.3	*2.8	2.7
29					4.50	3.35	2.45	2.64	1.8	*2.1	*2.7	2.6
30					4.34	3.35	2.45	2.54	1.8	*1.9	*2.6	2.7
31	V		V		3.35	.....	2.64	2.0	.....	*2.6	.....	2.7

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Low	High		Low		Total	Per Sq. Mile	
	High	Low		Dates						
January.....	.....	.....		.....		.....	8.57	527		
February.....	.....	.....		.....		.....	5.79	322		
March.....	.....	.....		.....		.....	5.33	328		
April.....	.....	.....		.....		.....	4.41	262		
May.....	13.38	10.65	1	803	16	2.64	9.01	554		
June.....	11.11	10.58	5	11	25	2.03	2.81	167		
July.....	11.60	10.57	26	37.6	21	1.96	2.57	158		
August.....	10.74	10.67	18	3.6	29	1.70	2.70	166		
September.....	19.37	*10.62	3	2,510	30	.....	*1.90	21.4	*1,280	
October.....	17.53	*10.62	17	1,610	1	.....	*1.90	12.3	757	
November.....	10.81	10.65	5	4.5	30	2.60	*2.88	*171		
December.....	10.68	10.62	8	2.9	4	2.30	2.60	163		
Yearly.....	19.37	.....		2,510		1.70	6.71	4,855	270	

\* Partly Estimated

†Estimated.

## RIO GRANDE AT DEL RIO STATION

**Description:** Automatic water-stage recorder, located 900 feet upstream from international highway bridge at Del Rio, Val Verde County, Texas. High stage measurements from highway bridge, low stage measurements from boat on cable at gage well. Zero of gage is 864.80 feet above mean sea level United States Coast and Geodetic Survey datum.

**Records:** Based upon 23 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** December, 1923 to December, 1934. Records are also available for station 11 miles upstream from May, 1900 to April, 1915; and for station 7½ miles upstream at McKeens Switch from December, 1919 to March, 1920. Several springs but no important tributaries enter the river between the various station sites.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 123,318 square miles; 88,539 being in the United States and 34,779 in Mexico.

**Previous Extreme Flows:** The highest recorded gage height was on Sept. 1, 1932, when the extreme gage height was 34.5 feet, discharge 605,000 second feet. The lowest flow ever recorded was in May, 1930, when the extreme gage height was 1.42 foot and the extreme flow 938 second feet. Numerous records of previous extreme flows may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,700	2,590	2,770	2,280	2,000	2,650	1,940	2,420	2,130	1,580	1,800	1,630
2	2,640	2,600	2,810	2,180	3,970	2,560	1,920	2,280	2,060	1,650	1,780	1,700
3	2,540	2,620	2,810	2,300	4,740	3,370	1,900	2,200	3,820	1,610	1,780	1,610
4	2,600	2,600	2,720	2,280	5,770	3,660	1,880	2,420	2,300	1,640	1,760	1,690
5	2,620	2,580	2,690	2,150	3,730	11,400	1,970	2,280	2,040	1,660	1,780	1,720
6	2,630	2,670	2,720	2,200	2,690	8,140	1,980	2,220	1,920	1,670	1,760	1,720
7	2,630	2,650	2,670	2,230	2,570	3,940	1,940	2,680	1,890	1,680	1,800	1,720
8	2,630	2,600	2,700	2,290	2,400	4,140	1,900	2,270	1,870	1,600	*1,780	1,690
9	2,620	2,600	2,570	2,220	2,240	3,870	1,860	2,240	2,020	1,660	*1,870	1,730
10	2,600	2,600	2,550	2,200	2,110	2,870	1,980	2,080	1,980	1,660	*2,030	1,700
11	2,560	2,620	2,580	2,170	2,040	2,500	1,980	2,090	1,930	1,780	*2,100	1,890
12	2,570	2,590	2,440	2,080	2,020	2,540	2,020	2,080	1,830	1,710	*1,970	1,790
13	2,620	2,560	2,630	2,080	1,920	2,410	1,940	1,940	1,850	1,700	*1,920	1,800
14	2,770	2,600	2,640	2,070	1,820	2,330	1,920	1,960	1,820	1,650	*1,920	1,780
15	2,740	2,600	2,500	2,080	1,900	2,280	1,980	1,940	2,040	1,520	*1,920	1,880
16	2,630	2,550	2,480	2,060	1,880	2,210	2,010	1,840	2,290	1,630	*1,860	1,840
17	2,620	2,560	2,510	2,330	1,940	2,160	1,900	1,770	1,990	4,540	*1,860	1,760
18	2,720	2,620	2,510	2,210	2,090	2,120	1,860	1,770	2,170	1,830	*1,860	1,880
19	2,620	2,670	2,440	3,400	2,000	2,120	2,350	1,820	2,010	1,710	*1,830	1,840
20	2,600	2,670	2,450	3,640	1,920	2,100	2,170	1,650	1,800	1,750	1,870	1,780
21	2,600	2,650	2,430	2,610	1,820	2,120	1,940	1,740	19,30	1,810	1,820	1,740
22	2,640	2,740	2,410	2,370	1,920	2,130	1,920	1,720	2,220	1,690	1,820	1,760
23	2,630	2,900	2,410	2,110	1,990	2,060	2,070	1,640	1,760	1,780	1,770	1,740
24	2,540	2,950	2,480	2,220	3,160	2,030	1,990	1,680	1,540	1,730	1,730	1,630
25	2,600	2,910	2,500	2,100	2,580	2,040	2,530	1,650	1,550	1,760	1,670	1,790
26	2,600	2,910	2,510	2,040	2,240	1,950	3,010	1,820	1,610	1,790	1,650	1,730
27	2,600	2,840	2,450	2,030	2,140	2,280	2,740	1,620	1,590	1,710	1,760	1,820
28	2,650	2,740	2,430	2,010	2,040	2,300	2,460	1,680	1,670	1,670	1,720	1,810
29	2,640	....	2,320	1,960	1,880	2,210	5,630	2,370	1,640	1,690	1,670	1,790
30	2,670	....	2,340	1,920	2,310	2,040	3,540	2,350	1,650	1,850	1,620	1,840
31	2,630	....	2,360	....	3,490	....	2,590	2,070	....	1,700	....	1,740

Month	Extreme Gage Height—Feet	Extreme Second Feet				Average Second Feet	Acre Feet		
		High		Low			Total	Per Sq. Mile	
		High	Low	Dates	Dates				
January.....	2.60	2.25	15	2,900	24	2,410	2,630	162,000	
February.....	2.68	2.25	24	3,040	16	2,410	2,670	148,000	
March.....	2.60	2.07	2	2,900	29	2,210	2,540	156,000	
April.....	3.55	1.73	19	4,750	29	1,820	2,260	135,000	
May.....	4.37	1.61	4	6,990	15	1,740	2,490	153,000	
June.....	6.64	1.74	5	16,800	30	1,880	3,020	180,000	
July.....	4.45	1.58	29	7,240	18	1,710	2,250	138,000	
August.....	2.70	1.34	7	3,080	25	1,530	2,010	124,000	
September.....	5.58	1.35	3	11,700	27	1,510	1,960	117,000	
October.....	4.75	1.28	17	8,260	3	1,480	1,790	110,000	
November.....	2.05	1.38	11	2,180	30	1,520	1,820	108,000	
December.....	1.92	1.39	19	2,070	1	1,530	1,760	108,000	
Yearly.....	6.64	1.28		16,800		1,480	2,260	1,639,000	
								13.3	

\* Partly Estimated

## SAN FELIPE CREEK STATION NEAR DEL RIO, TEXAS

**Description:** Automatic water-stage recorder at Silos farm road bridge 1½ mile south of Del Rio, Texas, 2 miles above the confluence with the Rio Grande, and 4 miles below the Del Rio gaging station on the Rio Grande. Zero of gage is 875.05 feet above mean sea level United States Coast and Geodetic Survey datum.

**Records:** Based upon 20 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** September 1, 1931 to December 31, 1934.

**Remarks:** The flow of this spring fed creek is greatly modified by irrigation and municipal diversions above this station. The drainage area above this station is 62 square miles, all in the United States.

**Previous Extreme Flows:** The highest previous recorded flow was on Aug. 31, 1932, when a flow of 3,030 second feet was reached with a gage of 12.84 feet. The lowest flow was 26.7 second feet on July 1, 1932. Backwater from the Rio Grande reached a gage height of 15.05 feet on Sept. 1, 1932.

Mean Daily Discharge in Second Feet and Annual Summary, 1924-1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	55.1	55.2	32.8	*24.1	63.0	31.3	11.2	25.1	11.2	11.2	11.3	2.4	
2	53.9	55.2	32.1	*24.1	157	195	11.2	26.3	11.2	9.6	11.6	2.4	
3	53.7	54.0	32.7	*24.2	46.3	19.3	10.5	26.2	926	12.8	11.6	3.7	
4	51.2	53.9	32.0	*24.2	44.7	33.7	10.2	26.1	33.9	12.6	11.5	5.6	
5	51.1	51.6	32.0	*24.2	45.6	27.3	10.2	26.6	31.7	9.7	11.9	8.1	
6	54.5	48.9	30	*24.2	45.0	22.0	9.8	27.2	33.9	8.8	11.9	8.1	
7	57.6	48.1	28.6	*24.2	39.5	20.9	10.2	26.5	33.9	9.6	12.8	8.1	
8	57.5	45.6	27.8	*24.2	40.3	22.8	13.5	27.2	33.1	9.2	12.8	8.1	
9	57.4	40.2	29.1	*24.3	40.4	24.0	14.0	27.2	31.6	8.43	12.4	9.6	
10	57.3	40.2	29.7	*24.3	40.5	24.1	11.7	27.2	29.6	7.95	11.1	12.0	
11	57.1	40.2	29.6	*24.9	40.6	25.3	14.9	27.9	28.1	7.95	11.5	10.3	
12	57.0	38.7	26.3	*24.1	23.5	40.1	25.4	15.4	28.5	26.8	8.7	11.9	10.3
13	56.9	37.1	24.5	*24.5	24.6	41.7	24.8	15.4	28.5	25.4	9.1	10.2	11.2
14	56.8	36.4	24.4	*24.4	26.2	41.0	25.5	14.6	26.5	30.7	9.4	6.7	11.2
15	57.8	37.1	*24.3	27.4	39.5	25.0	15.0	24.0	41.7	9.4	6.4	10.8	
16	59.9	36.4	*24.2	25.3	41.1	26.9	15.4	23.4	19.2	25.3	6.7	11.7	
17	61.0	36.4	*24.1	22.8	43.6	21.5	15.8	23.4	17.6	792	7.7	11.8	
18	59.8	35.6	*24.1	32.9	44.5	21.5	16.7	21.6	16.9	17.0	6.7	11.3	
19	57.5	36.4	*24.0	89.3	45.3	17.8	17.2	20.4	16.9	14.4	6.7	12.2	
20	58.5	36.4	*22.1	26.6	43.7	15.2	17.6	18.2	16.4	14.4	7.0	12.2	
21	58.4	35.6	*22.7	24.0	42.9	12.6	18.5	15.0	16.3	13.6	7.0	9.9	
22	58.3	37.1	*20.9	19.2	44.8	10.9	20.1	13.5	15.8	12.5	7.0	8.9	
23	58.1	44.7	*21.0	7.27	38.4	10.5	79.5	13.1	16.5	11.7	7.1	6.1	
24	44.8	35.5	*21.0	*10.1	37.7	10.6	21.6	13.1	16.6	11.2	7.8	5.6	
25	45.5	31.4	*21.6	21.0	38.5	11.4	19.8	13.1	11.4	14.4	8.5	5.7	
26	*40.6	31.4	*21.0	21.4	38.5	11.1	68.3	13.0	8.6	18.3	9.2	5.4	
27	*55.7	31.4	*21.0	22.1	32.7	11.1	38.0	13.0	8.5	15.6	8.6	5.7	
28	53.4	32.1	*21.0	21.6	30.4	10.4	145	11.2	8.7	14.6	4.7	5.4	
29	58.0	....	*21.1	21.7	31.7	10.1	47.7	10.8	8.0	16.1	2.5	5.5	
30	58.4	....	*21.1	21.8	32.2	11.6	27.8	11.6	14.3	15.5	2.5	5.3	
31	52.9	....	*21.1	....	30.7	....	25.7	10.8	....	13.5	....	5.3	

Month	Extreme Gage Height—Feet	Extreme Second Feet						Average Second Feet	Acre Feet		
		High			Low				Total	Per Sq. Mile	
		High	Low	Dates	Dates	Dates	Dates				
January.....	1.65	.77	29	106	24	*7.0	55.3	3,400			
February.....	1.27	.92	1	58.5	25	29.4	40.8	2,270			
March.....	1.00	.75	1	34.8	22	18.3	25.4	*1,560			
April.....	4.93	.44	19	895	24	3.76	25.2	1,500			
May.....	4.86	.91	2	867	27	28.0	44.6	2,740			
June.....	7.69	.53	2	2,220	21	7.78	25.3	1,510			
July.....	4.35	.55	28	691	3	9.4	25.2	1,550			
August.....	.99	.60	13	31.2	28	9.4	20.8	1,280			
September.....	14.47	.53	3	11,300	29	7.25	51.4	3,060			
October.....	10.76	.52	17	4,750	10	7.58	37.5	2,310			
November.....	.68	.32	7	13.2	30	2.5	8.8	526			
December.....	.68	.30	19	13.9	2	2.2	8.1	496			
Yearly.....	14.47	.30		11,300		2.2	30.7	22,202	358		

\* Partly Estimated

## SYCAMORE CREEK STATION NEAR DEL RIO, TEXAS

**Description:** Automatic water-stage recorder 2 miles above the confluence with the Rio Grande, 11 miles southeast of Del Rio, Texas, and just above the highway between Del Rio and Eagle Pass, Texas. Permanent station control. High stage measurements by area-slope, low stage measurements by wading with meter.

**Records:** Based upon 3 meter measurements. Computations by stable rating curve. 1934 records fair.

**Records Available:** January, 1932 to December, 1934.

**Remarks:** The flow of this spring fed creek is modified by small irrigation diversions above the station. The drainage area above this station is 524 square miles all in the United States.

**Previous Extreme Flows:** The greatest recorded flow was on September 2, 1932, when the extreme gage height was 17.10 feet and the extreme flow was 44,800 second feet. This creek is sometimes dry.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*2.2	*4.2	3.0	*2.3	*1.9	*1.3	0	0	0	0	.7	0
2	*2.2	*4.1	3.0	*2.3	*4.8	*1.3	0	0	0	0	.5	0
3	*2.2	*4.1	3.0	*2.2	*3.1	*1.3	0	0	85.8	0	.5	0
4	*2.2	*4.0	3.0	*2.2	*2.9	*1.2	0	0	3.8	0	.3	0
5	*2.2	*4.0	2.9	*2.1	*2.8	*1.2	0	0	2.3	0	.1	0
6	*2.2	*3.9	2.9	*2.1	*2.7	*1.1	0	0	2.1	0	0	0
7	*2.2	*3.9	2.9	*2.0	*2.7	*1.0	0	0	1.8	0	0	0
8	*2.2	*3.8	2.9	*2.0	*2.6	*1.0	0	0	1.6	0	0	0
9	*2.2	*3.8	2.9	*1.9	*2.6	*.9	0	0	1.6	0	0	0
10	*2.2	*3.7	2.9	*1.9	*2.6	*.9	0	0	1.6	0	0	0
11	*4.2	*3.7	2.8	*1.8	*2.4	*.8	0	0	1.4	0	0	0
12	*4.2	*3.6	2.8	*1.7	*1.85	*.8	0	0	1.3	0	0	0
13	*4.2	*3.6	2.8	*1.7	*1.85	*.7	0	0	1.3	0	0	0
14	*4.2	*3.6	2.8	*1.6	*1.85	*.6	0	0	1.3	0	0	0
15	*4.2	*3.5	2.8	*1.6	*1.85	*.5	0	0	1.4	0	0	0
16	*4.2	*3.5	2.8	*1.5	*1.7	*.45	0	0	2.6	8.9	0	0
17	*4.2	*3.4	2.8	*1.5	*1.6	*.45	0	0	2.3	32.3	0	0
18	*4.2	*3.4	2.7	*1.4	*1.6	*.35	0	0	1.8	2.6	0	0
19	*4.2	*3.3	2.7	*1.4	*1.5	*.30	0	0	1.6	2.1	0	0
20	*4.2	*3.3	2.7	*1.3	*1.4	*.25	0	0	.8	1.8	0	0
21	*4.2	*3.2	2.7	*1.3	*1.4	*.2	0	0	.7	1.6	0	0
22	*4.2	*3.2	2.7	*1.2	*1.5	*.2	0	0	.7	1.4	0	0
23	*4.2	*3.1	2.7	*1.2	*1.4	*.1	0	0	.3	1.3	0	0
24	*4.2	*3.1	2.6	*1.1	*1.4	*.1	0	0	.1	1.3	0	0
25	*4.2	*3.0	2.6	*1.1	*1.4	*.1	0	0	0	1.3	0	0
26	*4.2	*3.0	2.6	*1.0	*1.5	0	0	0	0	1.1	0	0
27	*4.2	*3.0	2.6	*1.0	*1.5	0	0	0	0	.9	0	0
28	*4.2	*3.0	2.5	*1.2	*1.4	0	0	0	0	.9	0	0
29	*4.2	...	2.5	*1.3	*1.4	0	0	0	0	.8	0	0
30	*4.2	...	2.4	*1.4	*1.3	0	0	0	0	.8	0	0
31	*4.2	...	2.4	...	*1.3	...	0	0	...	.7	...	0

Month	Extreme Gage Height—Feet			Extreme Second Feet				Average Second Feet	Acre Feet		
	High		Low	High		Low			Total	Per Sq. Mile	
	High	Low		Dates		Dates	Dates				
January.....	...	...	12	*4.2	1	*2.2		*3.55	*219		
February.....	...	...	1	*4.2	28	*2.0		*3.54	*196		
March.....	.50	.40	1	3.0	31	2.1		*2.80	*169		
April.....	.42	.30	1	2.4	26	1.0		*1.61	*95.8		
May.....	1.36	.33	1	*14.0	31	*1.3		*1.99	*123		
June.....	.33	....	1	*1.3		0.		*.57	* 33.9		
July.....	...	...				...		...	0	0	
August.....						0		0	0	0	
September.....	2.47	...	3	480		0		3.9	234		
October.....	1.90	...	17	259		0		1.9	119		
November.....	.33	...	1	.8		0.		.1	4.2		
December.....	...	...				0		0	0		
Yearly.....	2.47	...		480		0.		*1.65	*1,193.9	2.28	

\* Partly Estimated

## WATER BULLETIN NUMBER 4

## PINTO CREEK STATION NEAR DEL RIO, TEXAS

**Description:** Automatic water-stage recorder, cable with sit down cable car, and concrete control dam, 500 feet above Del Rio-Bigge Pass highway and  $5\frac{1}{2}$  miles above confluence with Rio Grande.

**Records:** Based upon 6 meter measurements and permanent rating curve. 1934 records good.  
**Records Available:** November, 1928 to December, 1934.

**Remarks:** The flow of this spring fed creek is modified by small irrigation diversions above the station. The drainage area above this station is 229 square miles, all in the United States.

**Previous Extreme Flows:** The greatest recorded flow was on Aug. 31, 1932, when the extreme gage height was 21.08 feet and the extreme flow 54,650 second feet. This flood flow of 239 second feet per square mile of water shed is the seventh largest ever recorded in North America for drainage areas of from 200 to 300 square miles. The creek is often dry.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.26	3.66	†2.86	1.76	133	0	0	0	0	0	.5	0
2	3.13	3.58	†3.13	1.67	233	0	0	0	0	0	.5	0
3	6.62	3.58	†3.34	1.61	*12.7	0	0	0	927	0	.5	0
4	4.05	3.73	†3.19	1.57	*8.32	0	0	0	6.8	0	.4	0
5	3.42	3.89	†3.13	1.56	*6.19	0	0	0	2.0	0	.4	0
6	17.2	3.73	3.06	1.59	*5.09	0	0	0	1.4	0	.4	0
7	4.18	3.73	3.06	1.64	*4.05	0	0	0	1.0	0	.3	0
8	3.50	3.81	2.93	1.73	*3.42	0	0	0	0.6	0	.2	0
9	3.34	3.73	2.67	1.73	*3.00	0	0	0	.6	0	.2	0
10	3.50	3.66	2.73	1.66	*2.46	0	0	0	.6	0	.1	0
11	4.31	3.81	2.80	1.49	*2.12	0	0	0	.6	0	0	0
12	4.18	3.73	2.80	1.32	*1.91	0	0	0	.6	0	0	0
13	3.58	3.66	2.60	1.21	*1.76	0	0	0	.6	0	0	0
14	3.58	3.58	2.53	1.17	*1.64	0	0	0	.5	0	0	0
15	3.58	3.58	2.39	1.17	*1.51	0	0	0	.5	0	0	0
16	3.58	3.58	2.36	1.17	*1.41	0	0	0	.5	61.7	0	0
17	5.77	3.58	2.25	1.16	*1.34	0	0	0	.5	1,420	0	0
18	6.19	3.58	2.02	1.16	*1.28	0	0	0	.4	29	0	0
19	4.31	3.34	1.81	1.18	*1.21	0	0	0	.4	8.3	0	0
20	3.97	3.42	1.67	1.44	*1.16	0	0	0	.4	3.4	0	0
21	3.89	3.42	1.72	1.56	*1.11	0	0	0	.3	2.1	0	0
22	3.89	3.34	1.77	1.31	*1.05	0	0	0	.3	1.7	0	0
23	3.81	3.34	1.82	1.17	*1.02	0	0	0	.2	1.4	0	0
24	3.81	3.26	2.08	1.09	*.82	0	0	0	.2	1.3	0	0
25	3.81	*3.00	3.97	1.04	*.61	0	0	0	0	1.0	0	0
26	4.05	*2.86	3.50	1.00	*.41	0	0	0	0	.6	0	0
27	4.05	†2.86	2.56	27.0	*.20	0	0	0	0	.6	0	0
28	3.97	†2.86	2.22	6.60	0	0	0	0	0	.6	0	0
29	3.81	.....	2.08	2.73	0	0	0	0	0	.6	0	0
30	3.66	.....	1.96	2.18	0	0	0	0	0	.6	0	0
31	3.58	.....	1.87	.....	0	..	0	0	0	0	0	0

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
	High		Low		High			Total	Per Sq. Mile
	High	Low	Dates		Dates				
January.....	3.76	3.07	6	43.6	2	3.06	4.44	273	
February.....	3.18	3.04	5	3.89	28	†2.86	3.50	194	
March.....	3.23	2.57	25	4.44	20	1.66	2.54	156	
April.....	4.44	1.77	27	316	26	.98	2.49	148	
May.....	5.90	....	2	2,770		0	13.0	*856	
June.....	....	....	....	....	....	0	0	0	
July.....	....	....	....	....	....	0	0	0	
August.....	....	....	....	....	....	0	0	0	
September.....	8.61	....	3	7,700		0	31.5	1,880	
October.....	7.08	....	17	4,600		0	49.5	3,040	
November.....	2.29	....	1	.5		0	.1	6.9	
December.....	....	....	....	....	....	0	0	0	
Yearly.....	8.61	....		7,700		0	9.05	6,553.9	28.6

\* Partly Estimated

†Estimated.

## RIO SAN DIEGO STATION AT JIMENEZ, COAHUILA

**Description:** Automatic water-stage recorder and cable with sit down cable car. Masonry Cipolletti weir control for measuring discharges up to 617 second feet. The station is located 4.4 miles west of Jimenez, Coahuila, and five miles above the confluence with the Rio Grande.

**Records:** Based upon 46 meter measurements. Computations by shifting channel methods. Records for 1934 good.

**Records Available:** 1924 to 1934.

**Remarks:** This station was constructed by the Mexican Section of the Commission and completed in November, 1932. From 1924 to 1932 there was a staff-gage at Paso del Salto, 3.1 miles upstream from the present station. Readings were made by agents of the Department of Agriculture, Monterrey, N. L. There is another gaging station on Rio San Diego at "Cabeceras", 31 miles upstream from the present station which is operated by the Mexican National Irrigation Commission. Theflow of this spring-fed stream is modified by small storage reservoirs at San Miguel and Centenario on the National Irrigation System No. 6 at San Carlos, Coahuila, and by irrigation of Dolores Hacienda just above this station. One-fourth mile downstream from this gaging station water is diverted for the Jimenez Community. The drainage area above this station is 840 sq. miles, entirely in Mexico.

**Previous Extreme Flows:** From reports by local inhabitants, the water level in 1905 reached a height of 20.67 feet on the present gage scale, the discharge being unknown. The stream never runs dry, although its flow at times is less than 35 second feet.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	75.2	93.6	44.1	44.1	125	44.1	32.5	403	215	104	64.8	58.6
2	75.2	84.0	44.2	44.2	74.7	44.2	32.5	388	215	104	67.0	52.3
3	93.6	75.2	44.1	44.1	175	37.8	38.8	374	2,860	104	58.6	52.3
4	103	75.2	44.2	44.2	125	37.8	38.8	374	512	104	58.6	52.3
5	104	75.2	44.1	44.1	114	37.8	38.8	374	305	93.9	58.6	52.3
6	114	75.2	44.2	44.2	84.0	37.8	38.8	357	290	93.9	58.6	45.6
7	125	66.8	37.8	44.1	75.2	37.8	38.8	357	260	93.9	58.6	52.3
8	137	66.8	44.1	44.1	84.0	37.8	32.5	403	244	93.9	52.3	67.8
9	137	66.8	37.8	44.2	84.0	37.8	32.5	388	215	93.9	58.6	67.8
10	149	75.2	37.8	44.1	75.2	37.8	32.5	374	201	93.9	52.3	58.6
11	149	66.8	37.8	44.2	66.7	31.4	32.5	374	201	84.8	52.3	52.3
12	125	66.8	37.8	44.1	66.7	31.4	38.8	374	175	84.8	58.6	52.3
13	114	66.8	37.8	44.1	66.7	31.4	38.8	357	175	84.8	52.3	45.6
14	114	51.2	37.8	44.2	58.6	44.1	32.5	357	175	76.3	52.3	45.6
15	114	51.2	37.8	37.8	51.2	51.2	32.5	339	230	76.3	67.8	45.6
16	114	58.6	37.8	44.1	58.6	37.8	32.5	325	244	76.3	76.3	52.3
17	125	58.6	44.1	44.2	58.6	37.8	32.5	325	274	84.8	67.8	52.3
18	125	58.6	44.2	44.1	58.6	31.4	32.5	305	274	76.3	58.6	52.3
19	125	58.6	44.1	44.1	51.2	31.4	38.8	305	260	76.3	58.6	45.6
20	125	58.6	44.2	44.2	44.1	20.5	38.8	305	215	76.3	58.6	45.6
21	125	58.6	44.1	51.2	44.1	20.5	38.8	305	161	76.3	58.6	52.3
22	125	58.6	37.8	51.2	44.1	20.5	38.8	290	148	76.3	52.3	52.3
23	114	58.6	44.1	51.2	44.1	20.5	32.5	274	148	67.8	52.3	58.6
24	114	58.6	93.6	58.6	247	25.8	32.5	274	138	67.8	58.6	58.6
25	114	58.6	51.2	58.6	149	25.8	32.5	274	138	67.8	58.6	52.3
26	114	51.2	51.2	58.6	66.7	31.4	516	260	125	67.8	58.6	52.3
27	114	44.1	44.1	84.1	58.6	31.4	403	260	115	67.8	58.6	104
28	114	44.1	44.1	58.6	58.6	31.4	448	260	115	67.8	67.8	58.6
29	114	....	44.1	51.2	51.2	31.4	480	244	104	67.8	67.8	52.3
30	114	....	37.8	51.2	51.2	31.4	466	230	104	67.8	52.3	52.3
31	103	....	37.8	....	51.2	....	448	230	....	67.8	....	52.3

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Low	High		Low		Total	Per Sq. Mile	
	High	Low		Dates						
January.....	2.33	2.10	11	150	1	75.2	116.	7,180		
February.....	2.17	1.97	1	93.6	28	44.1	63.6	3,530		
March.....	2.56	1.94	26	245	7	38.8	43.7	2,690		
April.....	3.38	1.94	27	653	15	37.8	48.4	2,880		
May.....	5.81	1.97	1	3,130	15	44.1	102.	6,280		
June.....	2.00	1.80	15	51.2	20	15.9	33.6	2,000		
July.....	4.30	1.90	26	1,320	8	32.5	118.	7,230		
August.....	2.92	2.49	1	417	31	215	324	20,000		
September.....	9.06	2.20	3	11,200	30	104	295	17,500		
October.....	2.20	2.07	1	104	26	67.8	81.9	5,040		
November.....	2.17	1.97	15	93.9	22	45.6	59.4	3,530		
December.....	2.53	1.97	27	230	19	45.6	54.7	3,360		
Yearly.....	9.06	1.80		11,200		15.9	112	\$1,200	96.7	

## LAS MORAS CREEK STATION NEAR EAGLE PASS, TEXAS

**Description:** Automatic water-stage recorder 0.6 mile above the confluence with the Rio Grande, 25 miles northwesterly from Eagle Pass, 0.1 mile above the main Eagle Pass-Del Rio highway, at the Las Moras Creek siphon on the Maverick County Canal. Zero of gage is 783.76 feet above mean sea level, United States Coast and Geodetic Survey datum. The Maverick County Canal siphon forms a fixed control for this station.

**Records:** Based upon 2 current meter measurements and dependable station rating curve. 1934 records good.

**Records Available:** January, 1932 to December, 1934.

**Remarks:** The flow of this spring fed creek is modified by small irrigation diversions above the station. The drainage area above this station is 166 square miles, all in the United States.

**Previous Extreme Flows:** The highest recorded gage height was on Aug. 31, 1932, when the extreme gage height was 7.07 feet with a discharge of 8,860 second feet. The creek is sometimes dry.

Rio Grande back water at this station reached a gage height of 13.2 feet on Sept. 2, 1932\*\* Large floods are known to have occurred in this creek on May 28, 1880; Oct. 1, 1881; and June 14, 1899.\*\*\*

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	11.6	1.28	3.72	.82	*.5	*.25	*1.00	.20	19.6	*1.0	*.5
2	0	7.39	1.51	3.40	103.	36.7	*.25	*1.00	.20	26.1	*1.0	*.5
3	0	4.21	2.31	2.81	56.9	20.2	*.25	*1.00	466.	1.8	*1.0	*.5
4	0	3.54	2.90	2.01	24.	4.04	*.25	*1.00	54.6	10.6	*1.0	*.5
5	0	3.54	2.03	1.78	12.1	2.53	*.25	*1.00	16.8	16.7	*1.0	*.5
6	0	3.54	1.76	2.53	9.26	1.55	*.25	*1.00	.35	.9	*1.0	2.8
7	0	3.22	2.60	4.04	7.89	.85	*.25	*.90	1.90	*.5	*1.0	27.0
8	0	3.22	2.31	3.10	7.03	.54	*.25	*.90	1.10	*.5	*1.0	31.3
9	0	3.22	2.03	2.53	7.46	*.5	*.25	*.80	1.00	*.5	*1.0	11.1
10	0	3.22	2.03	1.55	7.89	*.5	*.25	*.80	1.00	*.5	*1.0	6.2
11	0	3.22	2.03	1.17	9.26	*.5	*.25	*.80	.90	*.5	*1.0	28.4
12	0	2.31	2.03	.54	9.71	*.4	*1.00	*.70	.90	*.5	*1.0	32.8
13	0	1.51	1.28	*.5	8.79	*.4	*7.28	*.70	.80	*.5	*1.0	32.1
14	0	3.87	0.86	*.5	7.89	*.4	*1.00	*.60	.80	*.5	*1.0	29.8
15	.22	3.54	0.86	*.5	7.46	*.4	*1.00	*.60	.70	*.5	*1.0	22.9
16	.67	3.54	1.05	*.5	5.82	*.4	*.90	*.60	.70	3.3	*1.0	19.0
17	4.21	3.54	1.05	*.5	4.37	*.3	*.80	*.50	.60	67.3	6.7	17.8
18	11.6	3.22	0.22	*.5	3.72	*.3	*.70	*.50	.60	11.4	28.9	14.9
19	7.84	1.76	0.04	*.5	3.72	*.3	*.60	*.40	.50	1.4	34.1	1.8
20	3.87	1.51	0	*.5	4.04	*.3	*.50	*.40	.50	.7	28.0	*.5
21	1.76	1.05	0	*.5	4.04	*.25	*.50	*.30	.50	.6	3.0	*.5
22	1.76	.86	0	*.5	4.04	*.25	*.50	*.30	.50	.5	*1.0	*.5
23	2.31	.86	0.52	*.5	4.04	*.25	*.50	*.20	.50	11.5	*1.0	*.5
24	2.90	.86	14.9	*.5	3.40	*.25	*.50	*.20	.50	21.5	1.5	*.5
25	2.60	.50	17.8	*.5	4.37	*.25	*.50	*.20	.50	*.8	29.3	*.5
26	2.31	.22	7.84	*.5	4.04	*.25	*1.00	*.20	.50	*.8	28.4	*.5
27	1.28	.86	9.21	1.47	2.26	*.25	*1.00	*.20	.50	*.8	5.6	*.5
28	1.28	1.05	7.84	10.65	1.17	*.25	*1.00	*.20	.50	*.8	*1.0	*.5
29	1.28	.....	6.12	1.36	.72	*.25	*1.00	*.20	.50	*.8	*1.0	6.2
30	1.51	.....	4.94	.54	.54	*.25	*1.00	*.20	.50	*.8	*1.0	28.4
31	6.12	.....	3.87	.....	*.5	.....	*1.00	*.20	....	*.8	....	28.4

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet			
	High		Low	High		Low		Total	Per Sq. Mile		
	High	Low		Dates							
January.....	1.30	.65	31	13.8		0.	1.73	106.			
February.....	1.29	.92	1	13.2	26	.11	2.89	161.			
March.....	1.57	.87	24	31.6	23	0.	3.32	204.			
April.....	1.47	....	28	24.9		.50	1.67	100.			
May.....	2.34	....	2	348.	31	*.50	10.7	655.			
June.....	1.89	....	2	59.6		*.25	2.47	147.			
July.....	1.33	....	13	*16.5		*.25	*.81	49.6			
August.....	....	....		*1.0		*.20	*.57	*34.9			
September.....	3.85	....	3	2,700.		*.20	18.6	1,110.			
October.....	2.01	....	17	100.		*.50	6.6	405.			
November.....	1.61	....	19	35.8		*1.00	6.2	370.			
December.....	1.61	....	8	35.3		*.50	11.2	690.			
Yearly.....	3.85	....		2,700.		0.	5.57	4,032.5	24.3		

\* Partly Estimated

\*\* See Special Flood Report 1932 by United States Section of this Commission.

\*\*\*See U. S. G. C. Water Supply Paper No. 50, p. 344.

## RIO SAN RODRIGO STATION NEAR EL MORAL, COAHUILA

**Description:** Automatic water-stage recorder and cable with sit down cable car located 11.2 miles west of the town of El Moral, Coahuila, 19.9 miles northward from Piedras Negras and 11.8 miles above the confluence with the Rio Grande.

**Records:** Based upon 152 meter measurements. Computations by shifting channel methods. 1934 records good.

**Records Available:** 1922 to 1934.

**Remarks:** From 1922 to 1932 there were made daily 3 staff-gage readings at this station by Agencies of the Mexican Department of Agriculture at Monterrey, N. L. This station was constructed by the Mexican Section of the Commission and completed in October, 1932. Meter measurements began August 4, 1932. The automatic water-stage record began November 8, the same year. The flow of this spring fed river is modified by irrigation diversions at El Remolino, 27.3 miles upstream. At Casa Roja, 7.5 miles downstream, some water is diverted for irrigation. The drainage area above this station is 750 square miles, entirely in Mexico.

**Previous Extreme Flows:** The greatest recorded flow was on Sept. 7, 1932, when the extreme gage height was 16.08 feet and the extreme flow 81,200 second feet.

*Mean Daily Discharge in Second Feet and Annual Summary, 1934*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	60.0	25.1	39.9	27.9	35.3	17.3	3.88	35.3	51.2	72.4	28.2	25.1
2	60.0	31.0	27.9	27.9	213	20.1	3.88	28.3	51.2	51.2	28.2	25.1
3	55.1	35.3	25.1	25.1	70.6	19.8	3.88	25.1	228	46.2	28.2	25.1
4	45.2	39.9	25.1	22.2	45.2	19.8	3.88	22.6	72.4	35.3	28.2	25.1
5	50.0	39.9	22.2	25.1	35.3	17.3	3.18	17.3	51.2	39.9	28.2	25.1
6	45.2	35.3	25.1	60.0	27.9	12.4	3.18	17.3	57.6	35.3	28.2	28.1
7	39.9	39.9	25.1	70.6	25.1	10.2	2.47	14.8	51.2	31.1	28.2	31.1
8	39.9	39.9	25.1	45.2	25.1	8.50	2.47	14.8	51.2	31.1	28.2	25.1
9	50.9	39.9	25.1	31.1	22.6	8.50	2.47	14.8	51.2	31.1	28.2	25.1
10	55.1	39.9	25.1	31.1	25.1	7.06	2.47	14.8	57.6	31.1	31.1	22.6
11	65.3	39.5	22.2	25.1	25.1	7.06	2.47	17.3	51.2	31.1	31.1	22.6
12	60.0	39.5	22.2	25.1	25.1	7.06	3.18	20.1	51.2	31.1	31.1	25.1
13	60.0	39.9	25.1	25.1	25.1	7.06	3.18	25.1	57.6	28.3	31.1	25.1
14	60.0	39.9	25.1	25.1	25.1	7.06	3.88	28.3	65.0	31.1	31.1	25.1
15	60.0	31.1	25.1	25.1	20.1	7.06	3.88	31.1	65.0	31.1	31.1	25.1
16	60.0	35.3	25.1	22.2	20.1	7.06	3.88	31.1	51.2	31.1	31.1	25.1
17	70.6	39.9	25.1	25.1	17.3	7.06	3.18	35.3	51.2	45.2	31.1	28.1
18	65.3	39.9	22.2	31.1	17.3	7.06	2.47	39.9	45.2	39.9	31.1	25.1
19	60.0	35.3	20.1	247	17.3	7.06	2.12	39.9	45.2	35.3	31.1	20.1
20	60.0	35.3	20.1	96.8	17.3	7.06	2.12	39.9	51.2	31.1	31.1	20.1
21	60.0	35.3	22.2	55.1	14.5	7.06	2.12	45.2	45.2	31.1	28.2	20.1
22	50.9	35.3	25.1	45.2	14.5	7.06	1.77	45.2	51.2	31.1	25.1	22.6
23	39.9	39.9	25.1	39.9	14.5	6.00	3.88	45.2	51.2	28.3	25.1	25.1
24	35.3	35.3	31.1	31.1	14.5	4.94	45.2	45.2	35.3	28.3	25.1	25.1
25	31.1	31.1	60.0	27.9	14.5	4.94	22.6	45.2	35.3	25.1	25.1	25.1
26	31.1	31.0	35.3	27.9	14.5	4.94	306	45.2	35.3	25.1	25.1	25.1
27	31.1	31.1	31.1	39.9	14.5	4.94	232	45.2	35.3	25.1	25.1	39.9
28	27.9	35.5	27.9	60.0	12.3	4.94	70.6	45.2	35.3	25.1	25.1	65.0
29	25.1	....	27.9	35.3	14.5	4.94	45.2	45.2	31.1	25.1	25.1	51.2
30	25.1	....	27.9	31.1	17.3	3.88	31.1	51.2	57.6	25.1	25.1	35.3
31	27.9	....	27.9	....	14.5	....	39.9	51.2	...	25.1	...	31.1

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Dates	Low		Dates		Total	Per Sq. Mile	
	High	Low		Dates	Dates					
January.....	1.67	1.31	11	76.6	30	25.1	48.7	2,990		
February.....	1.51	1.31	14	50.9	25	25.1	36.3	2,020		
March.....	1.71	1.18	25	83.0	20	14.5	27.1	1,670		
April.....	2.69	1.28	19	406	3	22.2	43.6	2,590		
May.....	3.02	1.12	2	512	29	10.2	28.9	1,780		
June.....	1.28	.92	3	22.2	30	3.5	8.8	526		
July.....	3.77	.82	26	1,110	21	1.4	30.7	1,890		
August.....	1.51	1.15	31	51.2	7	12.4	33.0	2,030		
September.....	3.81	1.38	3	1,140	28	31.1	55.7	3,310		
October.....	1.71	1.31	1	83.0	26	25.1	33.3	2,050		
November.....	1.44	1.28	20	39.9	27	22.6	28.3	1,690		
December.....	1.71	1.25	28	83.0	20	20.1	27.9	1,710		
Yearly.....	3.81	.82		1,140.		1.4	33.5	24,256	32.3	

## RIO GRANDE AT EAGLE PASS STATION

**Description:** Automatic water-stage recorder and cable with stand up cable car and winch located  $\frac{1}{2}$  mile above the international highway bridge at Eagle Pass, Texas. Zero of gage is 682.91 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 23 meter measurements. Computations by shifting channel methods. 1934 records good.

**Records Available:** May, 1900 to April, 1916; November, 1923 to December, 1934.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States and by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 126,962 square miles; 90,043 being in the United States and 36,919 in Mexico.

**Previous Extreme Flows:** The greatest recorded flow was on Sept. 2, 1932, when the extreme gage height was 49.00 feet, discharge 569,000 second feet. The lowest flow ever recorded was on May 26, 1930, when the extreme gage height was 2.51 feet and the extreme flow 940 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,980	2,930	3,000	2,450	2,080	3,250	2,010	3,120	2,210	1,960	1,820	1,590
2	3,020	2,860	2,960	2,410	7,300	*4,040	1,890	2,990	2,360	1,740	1,840	1,650
3	2,920	2,860	3,000	2,300	4,750	*3,520	1,850	2,700	17,300	1,720	1,810	1,670
4	2,820	2,860	2,960	2,430	5,660	3,300	1,830	2,650	7,340	1,660	1,760	1,570
5	2,900	2,800	2,900	2,400	6,080	*4,780	1,810	2,810	3,190	1,710	1,790	1,680
6	3,000	2,780	2,840	2,270	3,960	*13,100	1,880	2,020	2,610	1,720	1,780	1,760
7	2,940	2,860	2,860	2,270	3,190	6,050	1,880	2,520	2,320	1,710	1,740	1,760
8	2,950	2,840	2,780	2,300	*3,100	3,960	1,830	3,050	2,080	1,720	1,780	1,780
9	2,950	2,750	2,800	2,340	*2,750	4,630	1,760	2,660	1,990	1,640	1,810	1,750
10	2,940	2,730	2,680	2,350	*2,500	*3,910	1,760	2,570	2,160	1,700	1,950	1,750
11	2,980	2,730	2,640	2,360	*2,360	*3,140	1,900	2,380	2,150	1,690	2,110	1,760
12	2,870	2,750	2,680	2,240	*2,170	2,650	1,930	2,360	2,090	1,820	2,140	1,980
13	2,850	2,690	2,480	2,130	*2,150	2,610	1,950	2,330	1,970	1,750	1,980	1,900
14	2,930	2,690	2,710	2,170	*2,090	2,580	1,920	2,180	1,970	1,710	1,910	1,900
15	3,090	2,690	2,690	2,160	*2,020	2,480	1,860	2,170	2,160	1,640	1,910	1,870
16	3,030	2,690	2,510	2,150	*1,990	2,360	1,910	2,120	2,340	1,500	1,890	1,930
17	2,980	2,610	2,490	2,230	*1,970	2,260	1,960	1,990	2,510	5,870	1,840	1,930
18	2,980	2,670	2,510	2,500	*2,000	2,160	1,840	1,920	2,240	4,110	1,890	1,820
19	3,040	2,710	2,490	2,810	*2,150	2,060	1,810	1,890	2,440	2,040	1,900	1,900
20	2,930	2,790	2,420	3,790	*2,050	2,000	2,470	1,920	2,200	1,820	1,900	1,880
21	2,920	2,840	2,420	3,630	*1,980	1,960	2,160	1,740	1,930	1,860	1,900	1,820
22	2,920	2,840	2,380	2,800	*1,900	2,090	1,950	1,810	2,050	1,840	1,800	1,760
23	2,980	2,940	2,350	2,560	*1,880	2,020	2,030	1,790	2,390	1,730	1,810	1,800
24	2,910	3,110	2,520	2,240	*2,100	1,940	2,260	1,710	1,810	1,880	1,780	1,780
25	2,830	3,110	2,830	2,310	*3,500	1,910	2,070	1,730	1,590	1,800	1,740	1,650
26	2,930	3,020	2,610	2,130	*2,800	1,940	3,740	1,730	1,600	1,810	1,680	1,820
27	2,940	3,070	2,610	2,080	*2,410	2,010	4,560	1,920	1,640	1,850	1,630	2,130
28	2,920	3,000	2,550	2,550	*2,260	2,310	3,360	1,730	1,610	1,750	1,740	1,970
29	2,960	• • •	2,490	2,090	2,230	2,310	4,120	1,780	1,690	1,700	1,700	1,900
30	2,930	• • •	2,360	2,050	*2,200	2,190	4,050	2,730	1,870	1,720	1,620	1,880
31	2,970	• • •	2,400	• • •	*2,550	• • •	3,940	2,540	• • •	1,900	• • •	1,950

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
	High		High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	4.23	3.96	16	3,170	4	2,650	2,950	181,000		
February.....	4.28	3.93	25	3,210	17	2,490	2,830	157,000		
March.....	4.27	3.78	25	3,230	23	2,230	2,640	162,000		
April.....	4.80	3.55	20	4,520	29	1,930	2,420	144,000		
May.....	6.79	3.50	2	10,700	23	*1,880	2,840	*175,000		
June.....	*8.35	3.52	6	*16,800	27	1,850	3,180	189,000		
July.....	5.83	3.41	30	7,640	10	1,660	2,330	143,000		
August.....	4.40	3.35	1	3,510	26	1,620	2,260	139,000		
September.....	13.08	3.32	3	41,800	28	1,510	2,790	166,000		
October.....	7.19	3.29	17	11,700	16	1,450	1,970	121,000		
November.....	3.78	3.35	12	2,260	30	1,510	1,830	109,000		
December.....	3.84	3.32	27	2,400	1	1,510	1,820	112,000		
Yearly.....	13.08	3.29		41,800		1,450	2,480	1,798,000	14.2	

\*Partly Estimated

†Estimated

## RIO ESCONDIDO STATION AT VILLA FUENTE, COAHUILA

**Description:** Automatic water-stage recorder and cable with sit down cable car located 3.1 miles southwest of the city of Piedras Negras on the outskirts of Villa de Fuente, 5 miles above the confluence with the Rio Grande and 5.6 miles below the confluence of the Rio San Antonio.

**Records:** Based upon 104 meter measurements. Computation by shifting channel methods. 1934 records good.

**Records Available:** 1922 to 1934.

**Remarks:** From 1922 to 1932 there were made daily 3 staff-gage readings 2,300 feet downstream from the present station by Agencies of the Mexican Department of Agriculture at Monterrey, N. L. The zero of this old gage is 0.79 foot above the zero datum of the gage at the present station, but the water surface is practically level between the two gages. The present station was constructed by the Mexican Section of this Commission and completed in September 1932. The flow of this spring fed stream is modified by irrigation diversions in the drainage basins of the San Antonio and the Escondido. The drainage area above this station is 1,170 square miles entirely in Mexico.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	74.2	25.4	14.1	38.1	48.0	8.48	6.36	30.7	4.94	42.0	1.41	10.9
2	74.2	25.4	16.6	31.4	484	763	5.30	28.3	4.94	42.0	1.41	10.9
3	70.6	25.4	15.2	19.1	187	171	5.30	33.5	229	20.8	1.06	13.8
4	66.7	25.4	12.7	15.2	89.0	57.9	6.36	33.5	74.9	10.2	1.06	12.7
5	74.2	25.4	24.0	15.2	63.2	41.0	5.30	30.7	42.0	8.12	.71	12.7
6	82.3	27.2	12.7	615	57.9	33.2	4.24	23.7	36.0	7.06	.71	9.18
7	82.3	29.3	11.7	328	52.6	31.4	3.53	21.5	28.6	6.00	1.41	5.30
8	82.3	29.3	17.7	112	52.6	33.2	2.83	14.8	23.7	6.00	1.41	7.06
9	78.0	29.3	22.2	78.8	50.1	29.7	4.24	14.1	22.2	6.00	1.41	4.59
10	66.7	31.4	17.7	60.4	50.1	28.3	5.30	14.1	19.4	6.00	1.77	4.59
11	48.0	29.3	15.2	50.1	41.0	23.0	4.24	12.7	12.0	6.00	1.41	4.59
12	56.9	29.3	12.7	38.8	29.7	18.7	5.30	12.0	10.6	5.30	1.41	4.59
13	56.9	33.6	22.2	29.7	28.3	17.3	5.30	11.7	10.6	5.30	1.77	6.00
14	56.9	33.6	19.1	26.5	26.5	15.9	12.0	10.6	12.0	6.00	1.77	4.59
15	56.9	29.3	15.2	24.7	26.5	14.8	12.0	9.18	200	5.30	2.12	5.30
16	78.0	37.8	15.2	24.7	28.3	6.71	6.36	9.18	44.5	4.59	2.47	5.30
17	86.2	42.7	15.2	45.6	26.5	6.71	5.30	9.18	36.0	5.30	2.12	5.30
18	82.3	45.6	12.7	336	24.7	6.71	4.24	6.71	33.9	18.4	2.12	4.59
19	66.7	42.7	17.7	171	20.1	6.71	3.53	6.71	30.4	10.2	2.47	6.00
20	48.0	37.8	16.6	125	13.4	7.42	3.53	5.65	28.6	5.30	4.59	7.06
21	45.6	48.0	14.1	85.5	12.0	6.71	3.53	4.94	20.8	1.77	6.00	13.8
22	33.5	48.0	15.2	72.0	9.5	6.00	4.24	4.24	12.7	1.77	2.83	7.06
23	27.2	48.0	17.7	60.4	20.1	6.00	1,090	4.94	12.7	1.77	2.83	9.18
24	27.2	50.9	12.7	57.9	22.2	6.71	2,840	4.24	13.8	1.41	7.06	10.2
25	27.2	53.7	25.4	50.1	45.6	6.71	130	4.24	13.8	1.41	3.88	10.2
26	29.3	50.9	29.0	33.2	28.3	7.42	112	5.65	15.9	1.41	9.18	19.4
27	31.4	56.9	32.8	33.2	28.2	6.71	177	4.94	20.8	1.77	4.59	91.8
28	25.4	19.1	35.3	38.8	20.1	6.71	78.0	4.24	23.7	1.77	4.59	49.4
29	29.3	...	34.2	43.1	10.6	6.71	51.6	4.24	23.7	2.12	3.88	39.9
30	42.7	...	35.3	43.1	10.6	9.89	42.0	4.24	34.3	10.9	8.12	38.1
31	25.4	...	34.2	...	8.5	...	44.5	4.24	...	7.06	...	36.0

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Low	High		Low		Total	Per Sq. Mile	
	High	Low		Dates						
January.....	2.39	1.57	6	95.3	28	22.2	55.9	3,440		
February.....	2.23	1.31	21	74.2	28	11.7	36.1	2,000		
March.....	2.10	1.15	26	45.6	21	7.42	19.8	1,210		
April.....	9.78	1.18	6	3,050.	5	8.12	90.1	5,360		
May.....	6.36	1.35	2	1,060.	31	6.71	52.1	3,200		
June.....	8.53	1.12	2	2,190	22	4.94	46.4	2,760		
July.....	11.42	1.08	24	4,450.	8	2.47	151.	9,290		
August.....	1.97	1.08	4	39.9	28	3.53	12.5	771		
September.....	6.20	1.12	3	999.	2	4.59	36.5	2,170		
October.....	2.20	.82	30	56.9	24	1.06	8.36	514		
November.....	1.57	.75	26	19.4	4	.35	2.92	174		
December.....	4.46	1.02	27	445.	10	3.18	15.2	932		
Yearly.....	11.42	.75		4,450.		.35	44.0	31,821	27.2	

## RIO GRANDE AT LAREDO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car. Cable and car located about  $\frac{1}{2}$  miles above the cities of Laredo, Texas and Nuevo Laredo, Tamaulipas. Water-stage recorder is attached to north abutment of railroad bridge at Laredo. Zero of gage at the cable is elevation 353.15 feet. The water-stage recorder was first located near the cable using the above gage. The recorder was moved to its present location in January, 1926, and zero of gage was elevation 352.65 feet. On August 25, 1930, zero of gage at recorder was changed to elevation 351.50 feet. All gage elevations are on United States Coast and Geodetic Survey sea level datum.

**Records:** Based on 163 meter measurements. Computations by shifting channel methods. 1934 records good.

**Records Available:** May 1900 to Mar. 1914; from October, 1922 to Dec. 1934.

**Remarks:** The river flow at this station is modified by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States and by many irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 132,915 square miles, of which 91,516 are in the United States and 41,399 in Mexico.

**Previous Extreme Flows:** The greatest previous recorded flow was on Sept. 3, 1932, when the peak gage reading was 52.20 feet, the flow being 402,590 second feet. In 1910 a minimum flow of 939 second feet was reached. Numerous records of extreme flows may be seen in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,700	3,160	3,000	2,230	1,910	1,750	2,210	4,310	2,360	7,450	1,570	1,620
2	2,700	3,070	2,860	2,230	2,100	3,320	2,010	3,500	2,280	2,830	1,700	1,570
3	2,700	2,860	2,860	2,330	9,250	26,100	1,830	3,210	2,010	1,870	1,700	1,630
4	2,700	2,820	2,860	2,230	6,000	5,370	1,700	2,900	15,400	1,630	1,660	1,530
5	2,700	2,820	2,860	2,150	4,800	3,850	1,640	2,650	12,300	1,630	1,660	1,530
6	2,700	2,820	2,860	2,700	5,720	3,500	1,640	2,490	3,780	1,570	1,630	1,530
7	2,860	2,700	2,820	4,380	4,560	10,800	1,570	2,650	2,830	1,570	1,660	1,620
8	2,860	2,700	2,700	4,380	3,500	6,890	1,640	2,490	2,360	1,600	1,660	1,710
9	2,700	2,820	2,700	3,250	2,860	4,310	1,700	2,550	2,140	1,600	1,660	1,670
10	2,820	2,820	2,650	2,540	2,750	3,800	1,640	2,900	2,010	1,570	1,630	1,670
11	3,710	2,700	2,700	2,540	2,540	4,170	1,570	2,490	1,880	1,540	1,700	1,710
12	3,070	2,700	2,650	2,400	2,240	3,210	1,530	2,360	2,650	1,570	1,730	1,670
13	2,820	2,700	2,550	2,230	2,240	2,630	1,640	2,210	2,010	1,570	1,830	1,670
14	2,700	2,700	2,550	2,090	2,190	2,240	1,640	2,210	1,880	1,630	1,570	1,820
15	2,700	2,650	2,400	1,950	2,190	2,330	1,640	2,210	6,180	1,600	9,680	1,760
16	2,860	2,650	2,550	2,090	1,870	2,190	1,700	2,010	2,580	1,570	4,200	1,760
17	3,080	2,700	2,550	2,400	1,680	2,050	1,570	2,010	2,280	1,570	1,870	1,760
18	3,080	2,650	2,400	3,920	1,150	1,990	1,570	1,940	2,210	2,050	1,770	1,760
19	2,860	2,470	2,330	2,860	1,680	1,930	1,640	1,900	2,360	5,830	1,700	1,820
20	3,000	2,470	2,400	2,700	1,150	1,870	1,570	1,700	2,010	2,720	1,730	1,670
21	3,000	2,550	2,400	3,070	1,930	1,750	1,530	1,640	2,210	1,870	1,730	1,710
22	2,860	2,700	2,330	3,780	1,930	1,750	2,080	1,640	2,010	1,730	1,600	1,760
23	3,070	2,700	2,330	3,360	1,750	1,680	3,300	1,530	1,760	1,660	1,700	1,710
24	3,360	2,700	2,330	2,650	1,570	1,680	5,380	1,480	1,800	1,660	1,730	1,670
25	3,160	2,860	2,330	2,330	1,930	1,680	5,090	1,480	2,140	1,600	1,730	1,670
26	2,860	3,000	2,470	2,150	2,860	1,620	5,830	1,480	1,800	1,660	1,700	1,670
27	2,700	3,000	2,700	2,150	3,570	1,620	5,540	1,530	1,440	1,660	1,730	1,670
28	2,860	2,860	2,470	2,650	2,470	1,570	4,840	1,480	1,390	1,630	1,660	2,660
29	2,860	...	2,470	2,150	2,120	1,670	4,380	1,570	1,440	1,660	1,630	2,140
30	2,860	...	2,470	2,130	1,990	2,050	3,300	1,530	1,880	1,630	1,700	1,950
31	3,080	...	2,400	...	1,870	...	5,090	1,480	...	1,600	...	1,820

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Dates	Low		Dates		Total	Per Sq. Mile	
	High	Low		Dates						
January.....	6.17	5.25	11	4,910	6	2,540	2,900	178,000		
February....	5.51	5.18	1	3,250	19	2,400	2,760	153,000		
March.....	5.45	5.09	1	3,070	26	2,150	2,580	159,000		
April.....	6.73	4.95	7	6,570	14	1,910	2,670	159,000		
May.....	7.94	4.72	3	11,400	24	1,570	2,820	174,000		
June.....	13.94	4.72	3	47,700	27	1,570	3,710	221,000		
July.....	7.22	4.63	26	8,330	20	1,480	2,580	159,000		
August.....	6.30	4.59	1	5,300	31	1,440	2,180	134,000		
September....	11.91	4.53	4	43,800	28	1,330	3,050	181,000		
October.....	8.20	4.53	1	12,700	17	1,500	2,040	126,000		
November....	9.02	4.56	15	19,600	1	1,540	2,050	122,000		
December....	5.64	4.63	28	3,370	3	1,490	1,740	107,000		
Yearly.....	13.94	4.53		47,700		1,330	2,590	1,873,000	14.1	

## DOLORES CREEK STATION NEAR SAN IGNACIO, TEXAS

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 3.2 miles above the confluence with the Rio Grande, and 14 miles north of San Ignacio, Zapata County, Texas. Zero of gage mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon previous rating curve and 3 meter measurements. 1934 records fair.

**Records Available:** January 1, 1932 to December 31, 1934.

**Remarks:** This creek is dry except during storms. The drainage area above this station is 606 square miles, all in the United States.

**Previous Extreme Flows:** On September 4, 1932, Rio Grande backwater reached a gage height of 343.06 at this station. On September 6, 1933 a peak flow of 21,300 second feet was reached with a gage reading of 327.17.

*Mean Daily Discharge in Second Feet and Annual Summary, 1934.*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	4.7	0	0	0	0	*5.0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	19.3	0	0	0	0	0	0
4	0	0	0	0	0	4.0	0	-80.2	0	0	0	0
5	0	0	0	0	0	0	0	16.4	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	.55	0	0	62.7	0	0	0	0	0
10	0	0	0	45.7	0	0	0	0	0	0	0	0
11	0	0	0	4.03	0	0	0	0	0	0	0	0
12	0	0	0	2.67	0	0	0	0	0	0	0	0
13	0	0	0	1.47	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	*105	0	0	0	902	0	0	0
16	0	0	0	0	*166	0	0	0	900	0	0	0
17	417	0	0	26.6	23.1	0	0	0	141	0	0	0
18	222	0	0	49.6	4.7	0	0	0	19.1	0	0	0
19	6.3	0	0	0	0	0	0	0	7.0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	2.0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	*1,030	0	0	0	0	0
26	0	0	0	0	0	0	*57	0	0	0	0	0
27	0	0	0	1.26	0	0	*4.2	0	0	0	0	0
28	5.0	0	0	356	0	0	0	0	0	0	0	0
29	2.6	0	0	202	0	0	0	0	0	0	0	0
30	0	0	0	26.4	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0

Month	Extreme Gage Height—Feet	Extreme Second Feet				Average Second Foot	Acre Feet		
		High		Low	Dates		Total	Per Sq. Mile	
		High	Low						
January.....	319.50	317.52	17	738		0	21.1	1,300	
February.....	.....	.....	.....	.....	.....	.....	.....	0	
March.....	.....	.....	.....	.....	.....	.....	.....	0	
April.....	320.05	.....	28	1,270		0	23.9	1,420	
May.....	318.72	.....	15	266		0	9.8	602	
June.....	318.27	.....	3	101		0	.78	46.2	
July.....	320.92	.....	25	2,360		0	37.2	2,290	
August.....	318.47	.....	4	178		0	3.12	192	
September.....	320.46	.....	16	1,740		0	65.6	3,910	
October.....	.....	.....	1	*5		0	.16	9.9	
November.....	.....	.....	.....	.....	.....	.....	.....	0	
December.....	.....	.....	.....	.....	.....	.....	.....	0	
Yearly.....	320.92	.....		2,360		0	13.5	9,770.1	
								16.1	

\* Partly Estimated

## RIO SALADO STATION AT CD. GUERRERO, TAMAULIPAS

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 6.2 miles above the confluence of the Rio Salado with the Rio Grande and 2 miles southeast of Ciudad Guerrero, Tamaulipas. Zero of gage in 265.74 feet above mean sea level, U. S. C. & G. S. datum.

**Records:** Based on 163 meter measurements during the year. Computations by shifting channel methods, 1934 records good.

**Records Available:** 1901 to 1912; 1923 to 1934.

**Remarks:** The flow of the Rio Salado is greatly modified by the Don Martin reservoir, which forms a part of National Irrigation System No. 4, Coahuila-Nuevo Leon, and by irrigation. This station was entirely rebuilt by the Mexican Section of this Commission in December, 1932, when an automatic water-stage recorder was installed. The drainage area above this station is 21,830 square miles, entirely in Mexico.

**Previous Extreme Flows:** The greatest recorded flow at this station was on September 7, 1933, when an extreme gage height of 18.86 feet was reached with a corresponding discharge of 48,800 second feet. The stream has not been dry since irrigation commenced in System No. 4 in 1931. Numerous extremes may be seen in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	403	353	201	247	692	116	102	295	139	2,220	78.0	51.2
2	403	322	215	232	463	788	111	231	80.2	2,830	74.5	53.3
3	396	343	216	223	322	1,440	115	174	80.2	862	71.3	50.0
4	381	322	215	238	261	353	111	345	96.4	431	68.2	64.6
5	371	304	232	215	223	201	111	314	178	277	64.6	64.6
6	371	304	295	3,880	201	168	111	155	177	184	68.2	62.2
7	360	295	270	6,640	180	148	111	96.8	140	131	89.0	62.2
8	353	286	238	1,640	174	126	120	77.0	111	109	89.0	62.2
9	353	295	215	816	209	101	111	70.6	118	92.5	84.8	81.6
10	371	286	216	551	167	101	438	65.0	99.6	118	78.0	96.4
11	371	286	286	353	211	120	837	62.2	104	122	71.3	89.0
12	360	270	261	286	215	143	562	56.9	104	92.5	68.2	89.0
13	360	270	247	238	180	131	597	54.4	113	100	62.2	84.8
14	371	254	270	232	154	121	353	59.3	113	105	62.2	84.8
15	353	247	254	215	780	101	281	83.7	316	88.3	68.2	89.0
16	353	238	254	232	395	92.5	281	83.7	424	81.2	64.6	89.0
17	371	343	270	385	304	101	187	70.6	537	1,000	64.6	100
18	360	396	247	396	215	101	143	62.2	285	643	64.6	100
19	353	286	215	270	174	126	120	62.2	179	136	62.2	89.0
20	381	261	232	322	161	148	102	62.2	122	97.5	64.6	74.5
21	353	238	295	322	161	126	96.8	65.0	92.5	107	71.3	68.2
22	343	254	286	254	154	121	96.8	68.2	81.2	97.5	64.6	62.2
23	583	238	281	194	137	116	161	65.0	81.2	81.2	64.6	59.0
24	371	232	270	180	131	96.8	161	70.6	81.2	74.2	62.2	64.6
25	353	223	215	174	1,140	88.3	720	73.8	70.6	70.6	56.2	78.0
26	335	209	201	160	238	88.3	752	73.8	61.4	81.2	53.3	108
27	335	201	281	364	335	96.8	396	92.2	58.3	85.5	56.2	140
28	343	201	281	1,890	270	106	287	76.6	61.4	85.5	59.0	84.8
29	343	...	223	4,030	187	126	215	96.4	70.6	31.2	53.3	81.6
30	381	...	232	2,280	154	116	187	109	342	85.5	51.2	81.6
31	381	...	232	...	126	...	187	96.4	85.5	...	81.6	81.6

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq Mile	
	High	Low	Dates		Dates					
January.....	5.12	3.61	23	1,130	26	322	371	22,800		
February.....	4.33	3.12	17	600	28	201	277	15,400		
March.....	3.67	3.12	21	343	1	201	247	15,200		
April.....	11.29	2.89	7	14,300	27	154	915	54,500		
May.....	6.20	2.69	25	2,300	24	120	281	17,300		
June.....	6.56	2.46	3	2,720	26	88.3	194	11,500		
July.....	6.00	2.53	11	2,070	22	97.5	263	16,200		
August.....	4.40	2.07	4	636	13	54.4	109	6,680		
September.....	7.35	1.61	30	5,010	27	57.9	151	8,960		
October.....	7.32	1.71	1	4,940	25	70.6	344	21,100		
November.....	1.90	1.44	7	92.9	30	48.0	67	3,990		
December.....	2.76	1.48	26	224	1	51.2	70.2	4,870		
Yearly.....	11.29	1.44		14,300		48.0	274	198,500	9.09	

## RIO GRANDE AT ZAPATA STATION

**Description:** Automatic water-stage recorder and cable with stand up cable car and winch located about 3 miles by river below the town of Zapata, Zapata County, Texas, and 1.2 mile below the confluence of the Rio Salado with the Rio Grande. Zero of the gage is at mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 24 meter measurements. Computations by shifting channel methods. 1934 records good.

**Records Available:** January, 1932 to December, 1934.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquillas and Don Martin reservoirs in Mexico. With all closed basins eliminated the drainage area above this station is 156,714 square miles; 92,613 being in the United States and 64,101 in Mexico.

**Previous Extreme Flows:** The greatest recorded flow was on Sept. 4, 1932 when the extreme gage height was 262.07 feet and the extreme flow was 261,180 second feet. The lowest flow recorded was on June 23, 1932, when the extreme gage height was 219.18 feet and the extreme flow 992 second feet.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,320	3,330	3,070	*2,500	3,370	2,140	2,350	5,830	*2,040	8,140	1,770	1,720
2	3,400	3,400	3,020	*2,460	2,740	2,320	2,430	4,380	*2,630	7,900	1,770	1,750
3	3,480	*3,380	3,050	*2,460	4,130	20,500	2,240	3,940	*2,580	3,900	1,860	1,710
4	3,450	*3,350	3,030	*2,520	9,870	12,300	2,060	3,650	*2,300	2,790	1,860	1,640
5	3,460	*3,290	3,060	*2,400	5,690	5,110	1,890	3,660	16,600	2,190	1,830	1,640
6	3,340	*3,310	3,080	*6,000	5,560	3,940	1,830	3,120	6,720	2,090	1,770	1,700
7	3,390	*3,280	3,100	*9,300	6,280	5,940	1,830	2,990	3,820	1,960	1,770	1,760
8	3,510	*3,460	2,940	*6,000	4,400	11,000	1,800	3,080	3,170	1,860	1,770	1,790
9	3,550	*3,430	2,970	*5,200	3,460	6,530	1,820	*2,710	2,660	1,870	1,770	1,910
10	3,440	*3,260	2,960	*3,800	2,930	4,240	2,260	*2,930	2,470	1,860	1,780	1,900
11	3,560	3,120	2,980	*2,900	3,080	4,070	3,150	3,280	2,300	1,840	1,780	1,900
12	4,510	3,100	3,040	*2,660	2,700	4,270	3,080	*2,920	2,270	1,860	1,810	1,900
13	3,720	3,080	2,920	*2,670	2,480	3,430	2,300	*2,820	2,970	1,870	1,990	1,830
14	3,490	3,020	2,900	*2,550	2,270	2,940	2,320	*2,610	2,220	1,890	2,050	1,830
15	3,310	3,030	2,930	2,580	4,510	2,680	2,070	*2,480	5,820	1,920	2,170	1,980
16	3,150	2,950	2,770	2,500	3,100	2,700	2,090	*2,400	8,570	1,950	9,700	2,000
17	3,680	3,080	2,870	2,500	2,480	2,700	1,970	2,240	3,500	2,460	3,740	2,000
18	4,500	3,330	2,960	3,280	2,090	2,620	1,880	2,260	2,810	2,620	2,460	2,000
19	3,670	3,060	2,770	4,270	2,040	2,570	1,910	2,260	2,590	3,520	2,220	1,990
20	3,590	2,780	2,650	3,150	2,040	2,510	1,940	2,200	2,590	5,420	2,040	1,990
21	3,460	2,730	2,640	3,060	2,040	2,440	1,930	2,050	2,310	3,470	2,040	1,830
22	3,420	2,830	2,770	3,310	2,090	2,300	1,900	1,950	2,410	2,530	2,030	*1,830
23	4,210	2,890	2,680	3,950	2,110	2,250	2,410	1,950	2,240	2,180	2,030	*1,880
24	3,640	2,920	2,670	3,410	2,040	2,180	3,650	1,920	1,980	2,000	2,020	*1,850
25	3,600	2,980	2,660	2,860	3,520	2,100	6,870	1,850	1,970	1,990	1,990	*1,850
26	3,440	3,040	2,610	2,610	2,370	2,070	9,140	1,880	2,330	1,910	1,990	*1,870
27	3,280	3,100	2,710	2,830	3,330	2,020	9,150	1,840	2,020	1,820	1,890	2,140
28	3,270	*3,120	2,990	6,450	3,660	2,020	6,570	1,510	1,680	1,820	1,860	2,050
29	3,300	....	*2,760	8,080	2,750	2,040	5,910	1,770	1,490	1,800	1,820	2,940
30	3,300	....	*2,700	5,730	2,420	2,070	4,640	1,860	*3,220	1,800	1,720	2,440
31	3,330	....	*2,700	2,270	.....	3,800	1,880	....	1,800	....	2,290	

Month	Extreme Gage Height—Feet	Extreme Second Feet				Average Second Feet	Acre Feet		
		High		Dates	Low		Total	Per Sq Mile	
		High	Low						
January.....	221.87	221.00	23	6,870	29	3,270	3,540	218,000	
February.....	*221.07	220.83	8	3,610	21	2,730	3,130	174,000	
March.....	220.93	220.74	7	3,100	21	2,570	2,870	176,000	
April.....	222.32	....	29	8,760	5	*2,400	3,800	226,000	
May.....	222.83	220.49	4	11,100	24	1,910	3,350	206,000	
July.....	225.13	220.52	3	39,600	27	2,020	4,200	250,000	
June.....	223.16	220.49	26	11,300	8	1,800	3,200	197,000	
August.....	222.00	220.49	1	6,230	30	1,770	2,660	164,000	
September.....	226.15	*220.39	5	*26,400	29	*1,430	3,410	203,000	
October.....	223.32	220.39	1	12,100	29	1,760	2,680	165,000	
November.....	224.00	220.37	16	15,600	30	1,690	2,240	133,000	
December.....	221.00	220.35	29	3,320	5	1,610	1,930	119,000	
Yearly.....	228.13	220.35		39,600		*1,430	3,080	2,231,000	
								14.2	

\*Estimated.

Partly Estimated

## EL TIGRE ARROYO STATION NEAR ZAPATA, TEXAS

**Description:** Automatic water-stage recorder located 21 miles southeast from Zapata, Zapata County, Texas, and about 2.7 miles above the confluence with the Rio Grande. Zero of gage is 212.99 feet above mean sea level, United States Coast and Geodetic Survey datum. Meter measurements at flood stages are made from highway bridge 6,400 feet below the recorder. Zero of gage at highway bridge is 208.13 feet above same datum.

**Records:** Based upon previous rating curve and 2 meter measurements. 1934 records fair.

**Records Available:** January 1, 1932 to December 31, 1934.

**Remarks:** This creek is dry most of the time and carries only storm flow. The drainage area above this station is 261 square miles, all in the United States.

**Previous Extreme Flows:** On September 5, 1932, Rio Grande backwater reached a gage height of 27.64 feet at this station.

*Mean Daily Discharge in Second Feet and Annual Summary, 1934*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	14.5	0	0	0	0	0	0	0	21.7	0	0
2	0	.53	0	0	0	0	0	0	0	*.5	0	0
3	0	0	0	0	0	0	0	0	0	*.5	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	54.7	0	0	0	0	0	0	0	0
9	0	0	0	0.1	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	*18	0	0	0	*16.3	0	0	0
16	0	0	0	0	0	0	0	0	.2	0	0	0
17	0	0	0	0	0	0	0	0	0	2.9	0	0
18	0	0	0	0	0	0	0	0	0	20.4	0	0
19	0	0	0	0	0	0	0	0	0	*1.9	0	0
20	0	0	0	0	0	0	0	0	0	*1.0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	35.2	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	33.7	0	0	0	0	0	0	0	0	0	0	0
26	.95	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	23.2	0	0	0	0	0	0	0	0	0	0	0

Month	Extreme Gage Height—feet	Extreme Second Feet				Average Second Feet	Acre Feet		
		High		Low			Total	Per Sq. Mile	
		High	Low	Dates	Dates				
January.....	1.68	....		155		0	3.00	185	
February.....	1.16	....		33		0	.54	29.8	
March.....	....	....		....		....	....	0	
April.....	2.67	....		460		0	1.83	109	
May.....	1.76	....		145		0	.58	36	
June.....	....	....		....		....	....	0	
July.....	....	....		....		....	....	0	
August.....	....	....		....		....	....	0	
September.....	1.09	....		44		0	.60	37.3	
October.....	1.72	....		130		0	1.60	97.0	
November.....	....	....		....		....	....	0	
December.....	....	....		....		....	....	0	
Yearly.....	2.67	....		460		0	.68	494.1	
								1.89	

\* Partly Estimated

## RIO ALAMO STATION AT CD. MIER, TAMAULIPAS

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 3 miles from the confluence of the Rio Alamo with the Rio Grande and 2/3 of a mile west of Ciudad Mier, Tamaulipas, Mexico, at a point called "Paso del Cantaro." Zero of gage is 187.04 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 170 meter measurements. Computations by shifting channel methods. 1934 records good.

**Records Available:** July 5, 1923, to 1926; 1928 and 1930 to 1934.

**Remarks:** This station was rebuilt in December 1932 by the Mexican Section of this Commission. The flood of Sept. 7, 1933 washed away the left "A" frame, but it was shortly replaced with a new one. The drainage area above this station is 1,840 square miles, all in Mexico.

**Previous Extreme Flows:** The greatest recorded flow occurred on Sept. 7, 1933 with an extreme gage height of 26.9 feet and a corresponding flow of 76,600 second feet. The river is often dry. Numerous records of extreme flows may be seen in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103	135	88.3	64.3	88.3	30.2	8.83	14.8	62.9	243	10.9	18.4
2	99.9	118	88.3	59.8	82.6	199	11.3	20.2	15.9	43.1	13.1	18.4
3	99.9	115	79.8	57.2	77.0	170	11.3	20.5	15.9	43.1	13.1	18.4
4	96.8	112	79.8	57.2	77.0	82.6	14.8	17.7	10.9	22.2	13.1	15.2
5	93.6	112	79.8	64.3	69.2	55.1	9.89	11.3	8.48	15.9	10.9	15.2
6	88.3	122	74.9	5,440	64.3	30.2	11.3	7.77	6.71	13.1	10.9	15.2
7	85.5	143	71.7	3,780	62.2	33.2	14.8	4.59	4.94	10.9	10.9	15.2
8	82.6	152	69.2	551	57.2	29.3	13.1	3.53	2.47	10.9	10.9	15.2
9	79.8	126	66.7	160	55.1	23.0	14.8	4.59	2.47	9.53	9.18	15.2
10	79.8	126	64.3	126	52.6	20.5	60.0	8.83	23.7	9.53	9.18	15.2
11	82.6	135	64.3	109	438	19.1	22.2	6.00	35.0	10.9	10.9	15.2
12	85.5	135	59.7	96.8	438	20.5	24.7	3.53	9.53	13.1	13.1	15.2
13	82.6	135	55.1	93.6	99.9	19.1	66.7	2.47	8.48	10.9	15.2	18.4
14	79.8	126	55.1	99.9	69.2	17.7	33.2	2.47	6.71	9.53	15.2	21.5
15	77.0	122	55.1	93.6	1,170	16.2	11.3	2.47	18.0	9.53	18.4	21.5
16	74.9	112	59.7	88.3	890	16.2	20.5	1.77	12.4	0.53	18.4	18.4
17	71.7	99.9	57.2	237	126	14.8	17.7	1.77	12.4	1,130	18.4	18.4
18	66.7	112	55.1	291	93.6	13.1	17.7	1.77	8.48	194	25.1	21.5
19	66.7	102	59.7	106	82.6	17.7	1.77	8.48	51.6	25.1	18.4	
20	66.7	99.9	59.7	202	77.0	14.8	14.8	1.77	6.71	25.8	25.1	18.4
21	69.2	90.8	62.2	108	74.9	13.1	11.3	2.47	6.71	19.1	29.0	18.4
22	71.7	85.5	59.7	93.6	71.7	9.89	11.3	2.47	6.71	15.9	29.0	18.4
23	103	82.6	57.2	93.6	88.3	8.48	8.83	1.77	6.71	15.9	25.1	18.4
24	522	85.5	57.2	93.6	88.3	8.48	7.77	1.77	6.71	13.1	25.1	18.4
25	90.8	82.6	55.1	88.3	66.7	8.48	8.83	2.47	6.71	15.9	25.1	18.4
26	90.8	77.0	62.2	85.5	66.7	11.3	11.3	2.47	6.71	15.9	25.1	18.4
27	90.8	74.9	57.2	340	62.2	13.1	20.5	1.77	1.41	13.1	25.1	21.5
28	103	79.8	57.2	576	57.2	11.3	17.7	1.77	1.41	13.1	25.1	18.4
29	143	....	55.1	106	57.2	14.8	14.8	1.41	1.41	13.1	25.1	18.4
30	122	....	59.7	106	55.1	16.2	11.3	.71	1,760	10.9	25.1	21.5
31	161	....	59.7	....	43.8	....	14.8	47.7	....	10.9	....	21.5

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Dates	Low		Dates		Total	Per Sq. Mile	
	High	Low		Dates	Dates			.....		
January.....	4.10	1.61	24	1,100	20	62.2	104	6,410		
February.....	2.53	1.74	7	180	27	71.7	111	6,150		
March.....	1.97	1.44	15	90.8	29	50.9	64.1	3,940		
April.....	14.07	1.51	6	12,400	5	55.1	449	26,700		
May.....	5.15	1.35	15	2,070	31	43.8	158	9,720		
June.....	3.58	.69	2	735	25	8.5	32.4	1,930		
July.....	2.82	.62	10	291	24	6.0	17.9	1,100		
August.....	2.89	.36	31	325	31	4	6.43	395		
September.....	10.66	.49	30	7,560	9	2.5	69.3	4,120		
October.....	5.51	.79	17	2,330	16	8.1	66.2	4,070		
November.....	1.05	.82	21	29.0	9	9.2	18.5	1,100		
December.....	.98	.92	18	21.5	5	15.2	18.1	1,110		
Yearly.....	14.07	.36		12,400		.4	92.2	66,745	36.3	

## RIO GRANDE AT ROMA STATION

**Description:** Automatic water-stage recorder at international bridge at Roma, Starr County, Texas. Zero of gage is 145.93 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 25 meter measurements during the year from bridge. Computations by shifting channel methods. 1934 records good.

**Records Available:** August, 1900 to March, 1914. November, 1922 to December, 1934.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated the drainage area above this station is 160,014 square miles; 93,645 being in the United States and 66,369 in Mexico. After March, 1929 the station was operated by the United States, and previously by Mexico. Datum of present gage is 1.1 ft. lower than that used prior to 1922. Backwater from the Rio San Juan sometimes reaches this station. See Water Bulletin No. 3 page 50.

**Previous Extreme Flows:** The greatest previous recorded flow was on Sept. 5, 1932, when the extreme gage height was 35.4 feet and the extreme flow 203,000 second feet. The lowest flow ever recorded was on May 29, 1925, when the extreme flow was 975 second feet. Records of other extreme flows may be found in Water Bulletin No. 1.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,290	3,650	3,180	2,610	4,210	2,260	2,230	4,620	2,160	6,580	*1,750	1,700
2	3,350	3,610	3,160	2,560	3,270	2,260	2,390	5,480	2,040	8,260	*1,710	1,700
3	3,400	3,590	3,180	2,530	2,870	6,210	2,240	4,130	2,540	5,830	*1,710	1,690
4	3,380	3,500	3,120	2,520	6,400	19,100	2,120	3,730	2,300	3,440	*1,820	1,670
5	3,380	3,400	3,110	2,540	7,220	5,860	1,950	3,510	*9,780	2,620	*1,750	1,600
6	3,330	3,340	3,110	7,760	4,930	5,910	1,850	3,240	*9,660	2,240	*1,800	1,660
7	3,260	3,320	3,120	11,400	5,710	5,290	1,820	2,770	4,590	*2,060	*1,760	1,740
8	3,320	3,280	3,030	5,820	5,370	9,480	1,800	2,790	3,390	*1,940	*1,750	1,750
9	3,420	3,210	2,950	6,110	3,920	9,050	1,790	2,730	2,890	*1,900	*1,760	1,770
10	3,360	3,210	2,920	4,680	3,360	6,120	2,010	2,600	2,550	*1,860	*1,750	*1,830
11	3,390	3,240	2,800	3,790	3,240	4,690	2,650	2,770	2,440	*1,790	*1,720	*1,810
12	3,620	3,170	2,920	3,090	3,760	4,840	3,380	2,760	2,280	*1,770	*1,740	*1,790
13	4,030	3,110	2,880	2,900	2,940	4,300	2,500	2,560	2,640	*1,810	*1,770	*1,790
14	3,500	3,080	2,800	2,850	2,763	3,620	2,250	2,460	2,650	*1,740	1,870	†1,800
15	3,390	3,030	2,790	2,710	4,680	3,170	2,070	2,330	2,960	*1,730	2,010	†1,800
16	3,340	3,030	2,740	2,600	5,380	2,890	1,960	2,330	8,020	1,730	5,820	†1,900
17	3,430	2,950	2,680	2,610	3,140	2,680	1,980	2,350	5,290	2,570	5,650	†1,900
18	3,980	3,150	2,730	2,830	2,680	2,460	1,890	2,180	3,200	2,810	2,760	†1,900
19	4,080	3,140	2,690	3,510	2,500	2,430	1,820	2,130	2,720	2,220	2,260	†1,900
20	3,500	2,980	2,620	3,550	2,470	2,410	1,820	2,080	2,630	4,540	2,060	†1,900
21	3,510	2,900	2,590	3,110	2,440	2,370	1,850	1,970	2,510	3,840	1,970	†1,860
22	3,470	2,920	2,670	2,950	2,440	2,300	1,850	1,890	2,360	2,650	1,960	†1,800
23	3,780	3,000	2,620	3,390	2,500	2,270	1,860	1,790	2,420	2,090	1,910	1,790
24	4,880	3,010	2,620	3,630	2,460	2,250	2,610	1,790	2,220	1,860	1,920	1,810
25	3,810	3,010	2,610	3,180	2,800	2,220	4,590	1,730	2,040	1,810	1,910	1,780
26	3,640	3,030	2,500	2,880	3,050	2,220	7,450	1,710	2,000	1,810	1,860	1,780
27	3,520	3,120	2,570	2,860	2,610	2,210	9,190	1,720	2,240	1,730	1,860	2,130
28	3,400	3,160	2,700	5,640	3,370	2,180	7,580	1,690	1,920	1,790	1,810	2,020
29	3,420	....	2,760	6,500	3,020	2,160	5,980	1,620	1,760	1,800	1,770	2,140
30	3,540	....	2,640	7,180	2,560	2,180	5,720	1,640	2,710	1,770	1,700	2,510
31	3,630	....	2,640	....	2,360	....	4,170	1,820	....	1,810	....	2,270

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
	High	Low	High		Low			Total	Per Sq. Mile	
			Dates	Dates	Dates	Dates				
January.....	4.97	3.15	24	6,050	1	3,210	3,560	219,000		
February.....	3.43	2.74	1	3,650	22	2,890	3,150	177,000		
March.....	3.03	2.46	3	3,200	27	2,550	2,830	174,000		
April.....	9.78	2.41	6	22,900	4	2,500	4,010	239,000		
May.....	6.46	2.29	4	9,050	31	2,330	3,560	219,000		
June.....	10.99	2.01	4	30,200	29	2,150	4,250	253,000		
July.....	6.90	1.91	27	9,800	9	1,780	3,080	189,000		
August.....	4.95	1.67	2	6,130	29	1,620	2,550	157,000		
September.....	8.88	1.79	5	21,100	30	1,750	3,300	196,000		
October.....	6.32	*1.75	2	8,790	27	*1.710	2,660	163,000		
November.....	6.71	*1.70	16	9,500	3	*1.680	2,130	127,000		
December.....	2.81	*1.61	30	2,940	5	*1.580	1,850	114,000		
Yearly.....	10.99	*1.61		30,200		*1,580	3,080	2,227,000	13.9	

\*Partly Estimated

Estimated.

INTERNATIONAL BOUNDARY COMMISSION

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## RIO SAN JUAN STATION AT SANTA ROSALIA, TAMAULIPAS

**Description:** Automatic water-stage recorder and cable with sit down cable car located about  $27\frac{1}{2}$  river miles above the confluence with the Rio Grande and 15 miles south of Ciudad Camargo, Tamaulipas, Mexico, at a ranch called Santa Rosalia, 3 miles west of Ochoa Railway Station. Zero of gage is 205.15 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 165 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** May 1, 1900 to 1913; 1923 to 1934.

**Remarks:** Daily gage readings began May 1, 1900, and meter measurements Oct. 3, 1900 at La Quiemada Ranch (low Ochoa settlement). The station was moved  $2\frac{1}{2}$  miles upstream to its present location July 14, 1902. The datum of the gage at La Quiemada is not known. The gage zero at Santa Rosalia was raised on Oct. 1, 1909, an unknown amount and on May 27, 1912, the same gage was lowered 11 feet. Whether the gage zero has been moved at other times is not known.

When the river at this station rises above a gage height of 36.1 feet, water overflows the left river bank above the station and returns to the river below the station. At a gage height of 42.6 feet, water submerges the right river bank at the station but follows the main river. The river flow is modified at this station by irrigation diversions, and other uses along the San Juan River basin. The drainage area above this station is 13,000 square miles, entirely in Mexico.

**Previous Extreme Flows:** On Sept. 29, 1932, there was recorded an extreme gage height of 41.01 feet with an estimated discharge of 187,000 second feet. On August 30, 1909, there occurred a flood which reached a height estimated at 49.21 feet on the present scale, according to records of the residents of the region. In Water Bulletin No. 1, the mean daily flow for this flood was given as 30,000 second feet which was copied from the records. New slope-area computations supported by measurements during recent floods, show the 1909 flood peak to have been 353,000 second feet without considering the water which overflowed the river channel to a width of nearly 2 miles. The river runs dry at times. In Water Bulletin No. 1 may be seen numerous records of extreme flows.

*Mean Daily Discharge in Second Feet and Annual Summary, 1934*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,820	1,730	865	463	1,253	639	168	1,570	639	1,480	441	339
2	1,770	1,550	890	452	1,120	639	150	1,240	1,290	8,940	424	339
3	1,750	1,430	901	463	1,050	720	155	1,090	1,110	4,380	424	350
4	1,700	1,410	890	477	1,020	1,020	155	890	901	2,780	431	360
5	1,670	1,390	851	1,840	889	1,050	155	738	2,080	2,030	456	350
6	1,630	1,350	819	2,190	925	699	138	664	1,710	1,550	424	360
7	1,620	1,290	809	3,880	865	544	144	618	1,060	1,320	392	371
8	1,550	1,260	777	3,310	791	424	155	583	848	1,140	371	371
9	1,520	1,250	721	1,900	738	367	155	530	738	1,020	456	371
10	1,520	1,220	713	1,350	807	335	155	487	671	975	431	381
11	1,550	1,180	609	1,110	1,650	316	155	452	639	879	410	381
12	1,540	1,150	609	883	2,510	286	322	413	618	833	392	371
13	1,500	1,170	699	788	3,370	258	1,180	378	1,750	939	441	371
14	1,480	1,150	692	738	2,490	242	8,860	344	2,100	819	540	371
15	1,470	1,130	682	869	3,960	226	4,550	325	1,410	766	466	360
16	1,420	1,100	650	844	5,440	209	2,860	316	1,090	699	441	360
17	1,390	1,080	632	777	2,670	195	2,020	279	1,290	830	424	360
18	1,390	1,030	600	738	1,730	188	1,630	242	1,220	2,180	410	360
19	1,380	1,010	572	816	1,360	175	1,380	226	1,090	1,310	424	350
20	1,360	971	544	2,810	1,140	162	1,190	217	1,010	809	424	360
21	1,360	989	533	2,970	1,010	168	1,060	217	890	699	410	339
22	1,350	989	533	3,370	918	150	964	217	766	671	410	332
23	1,350	989	533	1,930	2,670	138	1,180	217	699	629	406	325
24	1,320	946	533	2,310	2,240	138	1,570	201	629	607	392	325
25	1,290	911	505	1,680	1,600	132	1,010	181	583	593	392	325
26	1,260	879	487	1,260	795	127	1,110	175	738	576	381	325
27	1,240	851	487	1,200	865	258	1,640	201	727	544	381	307
28	1,130	851	487	4,170	1,120	297	890	251	576	530	371	307
29	2,270	...	487	2,350	1,060	202	727	196	487	505	371	307
30	1,620	...	477	1,780	798	175	833	168	438	505	360	307
31	1,620	...	463	...	699	...	918	150	...	491	...	314

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	8.92	5.91	29	2,630	28	1,190	1,520	93,500		
February.....	7.12	4.95	1	1,770	27	840	1,150	64,000		
March.....	5.15	3.87	3	911	31	463	653	40,190		
April.....	13.19	3.84	7	6,570	2	452	1,050	98,500		
May.....	15.78	4.36	15	11,500	31	650	1,600	98,400		
June.....	6.14	2.62	5	1,310	26	127	349	20,800		
July.....	15.49	2.69	14	11,400	6	138	1,210	74,500		
August.....	6.50	2.76	1	1,710	31	150	444	27,300		
September.....	9.25	2.82	13	3,170	1	161	995	59,200		
October.....	16.37	3.77	2	13,700	1	424	1,360	83,400		
November.....	4.30	3.61	14	593	20	360	417	24,800		
December.....	3.67	3.41	7	371	29	284	687	21,300		
Yearly.....	16.37	2.62		13,700		127	975	705,800	54.3	

## LOS OLMOOS CREEK STATION NEAR RIO GRANDE CITY, TEXAS

**Description:** Automatic water-stage recorder attached to pile of lower side of highway bridge about 1 mile north of Rio Grande City and 3½ miles above confluence with the Rio Grande. Zero of gage is at mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 2 meter measurements and the previous rating curve. 1934 records fair.

**Records Available:** January 1, 1932, to December 31, 1934.

**Remarks:** The drainage area above this station is 535 square miles, all in the United States.

**Previous Extreme Flows:** The greatest recorded flow was on Oct. 1, 1932, when the extreme flow was 3,340 second feet with a gage height of 166.57 feet. The creek is dry except during storms.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	17.8	0	7.48	*1.0	.9	0	0	175	77.4	0	0
2	0	4.99	0	0	*.5	.9	0	0	113	35.4	0	0
3	0	.81	0	0	0	.7	0	0	8.4	*8.0	0	0
4	0	0	0	0	0	.6	0	0	3.0	*5.5	0	0
5	0	0	0	0	0	.3	0	0	3.0	*4.3	0	0
6	0	0	0	0	0	.2	0	0	3.0	*3.4	0	0
7	0	0	0	0	0	.1	0	0	2.0	*2.9	0	0
8	0	0	0	0	0	0	0	0	2.0	*2.4	0	0
9	0	0	0	0	0	0	0	0	2.0	2.0	0	0
10	0	0	0	0	0	0	0	0	1.0	1.7	0	0
11	0	0	0	0	0	0	0	0	1.0	1.4	0	0
12	0	0	0	0	0	0	0	0	.8	1.1	0	0
13	0	0	0	0	0	0	0	0	.7	.8	0	0
14	0	0	0	0	0	0	0	0	.6	.5	0	0
15	0	0	0	0	0	0	0	0	49.2	.2	0	0
16	0	0	0	0	0	0	0	0	26.5	0	0	0
17	80.1	0	0	0	0	0	0	0	6.0	3.3	0	0
18	48	0	0	0	0	0	0	0	5.0	3.1	0	0
19	12.7	0	0	0	0	0	0	0	1.6	2.4	0	0
20	6.36	0	0	19.1	0	0	0	0	1.0	1.6	0	0
21	3.70	0	0	.84	0	0	0	0	.9	1.0	0	0
22	2.04	0	0	0	0	0	0	0	.9	.5	0	0
23	30.5	0	0	0	0	0	0	0	.9	0	0	0
24	20.3	0	0	0	0	0	0	0	.9	0	0	0
25	6.88	0	0	0	180	0	0	0	.9	0	0	0
26	5.52	0	21.9	0	25	0	0	0	0	.5	0	0
27	98	0	2.82	0	19	0	0	0	0	.3	0	0
28	29.1	0	.34	257	12	0	0	0	0	.2	0	0
29	10.4	0	0	114	3.7	0	0	0	0	.2	0	0
30	34.5	0	0	14.9	2.3	0	0	0	0	5.6	0	0
31	32.6	0	0	....	1.3	....	0	0	14.4	0	0	0

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet				
	High		Low		High			Total				
	High	Low	Dates		Dates							
January.....	158.80	153.80	27	168		0	13.6	834				
February.....	154.98	.....	1	25.3		0	.84	46.8				
March.....	155.90	.....	26	54.0		0	.84	49.7				
April.....	160.30	.....	28	500		0	13.8	820				
May.....	159.42	.....	25	340		0	7.9	486				
June.....	.....	.....	.9			0	.12	7.34				
July.....	.....	.....						0				
August.....	156.18	.....	31	56.5		0	.46	28.6				
September.....	159.83	.....	1	*360		*.2	13.8	823				
October.....	158.35	.....	1	136		.0	5.12	315.				
November.....	.....	.....					....	0				
December.....	.....	.....					....	0				
Yearly.....	160.30	.....		500		0	4.71	3,410.44	6.37			

\* Partly Estimated

## RIO GRANDE AT RIO GRANDE CITY STATION

**Description:** Automatic water-stage recorder and cable with stand up cable car and winch located about 4 miles by river below Rio Grande City, Starr County, Texas, and 7.3 miles below the confluence of the Rio San Juan with the Rio Grande. Zero of gage is at mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 33 meter measurements during the year. Computations by shifting channel methods. 1934 records good.

**Records Available:** January 1, 1932 to December 31, 1934.

**Remarks:** When the water at this station rises above a gage height of about 151 feet, water overflows the left river bank beyond the station cable, but such water is measured.

When floods in the Rio San Juan exceed a gage height of about 38 feet or a flow of about 160,000 second feet at the Santa Rosalia station, water begins to overflow the right bank of that river at several places from El Asucar (20 miles below Santa Rosalia station) downstream. This overflow water cuts across country and reaches the Rio Grande about 9 river miles below Rio Grande City gaging station and is therefore not measured there. The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated, the drainage area above this station is 174,208 square miles; 94,323 being in the United States and 79,885 in Mexico.

**Previous Extreme Flows:** The highest reported gage height was in 1909, when the extreme gage height was 159.2 p. t. gage datum, as reported by residents.

## Mean Daily Discharge, Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5,250	5,390	4,090	3,260	7,250	3,000	2,160	5,240	2,500	* 4,580	2,340	*2,090
2	5,260	5,420	4,160	3,230	4,820	2,850	2,370	7,440	3,300	*13,900	2,260	*2,110
3	5,280	5,140	4,200	3,180	4,040	3,340	2,580	6,110	3,580	12,900	2,180	*2,090
4	5,300	4,970	4,200	3,160	5,270	20,700	2,390	*4,800	3,630	7,720	2,230	*2,060
5	5,210	4,780	4,150	3,210	10,100	9,170	2,270	*5,330	* 5,600	5,620	2,300	*2,060
6	5,160	4,630	4,130	† 9,600	6,980	6,830	2,120	*4,180	*14,900	4,280	2,280	*2,100
7	5,040	4,590	4,110	† 13,500	6,410	5,850	2,030	*5,580	* 7,330	3,630	2,240	*2,170
8	5,010	4,530	4,060	† 9,700	7,030	8,240	2,020	*3,330	* 5,400	3,240	2,170	*2,250
9	5,060	4,450	3,890	† 9,420	5,400	11,500	1,990	*3,410	4,170	2,990	2,150	*2,260
10	5,070	4,370	3,810	† 6,580	4,190	7,960	2,080	*3,200	3,540	2,860	2,290	*2,360
11	5,000	4,410	3,770	† 5,144	3,930	5,680	2,460	*3,130	3,170	2,770	2,270	*2,410
12	5,130	4,380	3,730	† 4,50*	3,940	4,950	3,100	*3,500	2,990	2,730	2,220	*2,420
13	5,740	4,310	3,760	* 4,324	3,000	4,900	3,930	*3,130	2,870	2,660	2,220	*2,350
14	5,290	4,280	3,620	* 4,15*	3,10	3,960	7,830	*2,910	5,100	2,740	2,220	*2,340
15	4,970	4,230	3,570	4,01*	3,40	3,400	9,260	2,810	* 4,440	2,620	2,470	*2,350
16	4,810	4,180	3,520	3,91*	13,600	3,010	6,200	2,730	* 8,750	2,600	4,380	-2,380
17	4,800	4,060	3,350	3,700	7,970	2,890	4,720	2,780	* 8,650	2,840	7,880	*2,460
18	5,090	4,030	3,380	3,730	5,100	2,750	3,910	2,600	* 5,860	4,450	*2,770	*2,410
19	5,890	4,250	3,360	4,130	3,890	2,660	3,460	2,490	* 4,380	5,020	*3,800	*2,430
20	5,380	4,040	3,220	5,400	3,400	2,580	3,220	2,420	* 3,790	4,080	*2,780	*2,390
21	5,030	3,840	3,120	6,220	3,160	2,530	3,090	2,340	* 3,560	6,010	*2,500	*2,400
22	4,950	3,820	3,120	6,000	2,990	2,460	2,990	2,220	* 3,390	4,160	*2,370	*2,320
23	4,990	3,880	3,210	5,640	3,260	2,320	2,830	2,150	* 3,280	3,090	*2,340	*2,260
24	6,530	3,970	3,140	5,840	6,080	2,300	3,310	2,120	* 3,060	2,700	*2,340	*2,300
25	5,550	3,940	3,160	5,546	4,000	2,240	4,330	2,060	* 2,640	2,540	*2,310	*2,280
26	5,220	3,930	3,200	4,66*	4,750	2,200	7,440	1,980	* 2,620	2,500	*2,250	*2,260
27	5,080	3,950	3,150	4,07*	3,570	2,200	12,000	1,980	* 2,990	2,410	*2,240	*2,290
28	4,700	4,060	3,200	7,80	3,760	2,270	11,400	2,000	* 2,660	2,360	*2,240	*2,630
29	5,240	... .	3,160	8,70	5,060	2,270	7,510	1,980	* 2,230	2,390	*2,210	*2,370
30	5,650	...	3,370	9,00	3,860	2,180	6,810	1,880	* 2,030	2,350	*2,110	*2,890
31	5,370	...	3,290	...	3,260	...	6,080	2,030	...	2,360	...	2,770

Month	Extreme Gage Height—Feet			Extreme Second Feet			Average Second Feet	Acre Feet		
	High		Low	High		Low		Total	Per Sq. Mile	
	High	Low		Dates	High	Low		Dates		
January.....	131.23	129.87	24	7,090	28	4,640	5,230	321,000		
February.....	130.42	129.24	1	5,510	21	3,780	4,350	242,000		
March.....	129.42	128.54	3	4,250	22	3,070	3,600	221,000		
April.....	(132.25)	128.37	7	+20,000	9,260	4	3,080	5,710	340,000	
May.....	(132.11)	....	5	10,900	22	2,950	5,360	330,000		
June.....	(132.97)	128.60	16	16,000	22	2,950	5,360	330,000		
July.....	(135.41)	....	4	25,300	....	....	....	....		
August.....	132.29	127.85	9	13,100	28	2,150	4,640	276,000		
September.....	132.75	127.68	28	13,900	9	1,980	4,450	274,000		
October.....	131.11	127.46	2	7,880	30	1,870	3,120	192,000		
November.....	133.55	127.68	6	19,300	30	*1,940	4,410	263,000		
December.....	133.85	*127.68	2	18,800	1	*1,930	4,100	252,000		
Yearly.....	135.41	*127.42		25,300			1,870	4,160	3,010,000	
									17.3	

\* Partly Estimated

†Estimated.

### RIO GRANDE AT HIDALGO STATION

**Description:** Staff gage at international bridge at Hidalgo, Hidalgo County, Texas. Zero of gage is 79.28 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based upon 2 meter measurements during August and October from bridge.

**Records Available:** July, 1928 to Dec. 1931, also Sept. and Oct., 1932, and Sept., 1933.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated, the drainage area above this station is 175,110 square miles; 94,663 being in the United States and 80,447 in Mexico. Since 1931 this station has been operated only during flood periods. When the river rises above a stage of about 18 feet on this gage, water begins to overflow into the American floodways above this station. In 1934 this gage height corresponded to a river discharge of about 50,000 second feet. The bottom of the river at this station is subject to considerable erosion during floods.

**Previous Extreme Flows:** See Water Bulletins numbers 1 and 2 and Special Flood Report 1932 by the American Section of this Commission.

*The Four Largest Peak Flows in 1934*

Date	Gage - Feet	Second Feet	Remarks
Apr. 7	8.9	17,000	From 1934 station rating curve
June 5	9.8	20,000	" " " "
Sept. 6	8.9	16,900	Estm. from Rio Grande City Station
Oct. 3	9.1	17,600	" " " "

### NORTH FLOODWAY STATION SOUTH OF McALLEN, TEXAS, and SOUTH FLOODWAY STATION SOUTH OF McALLEN, TEXAS

**Description:** See Water Bulletin No. 2 for description of these stations, etc.

**Remarks:** These floodways divert only excess flood water from the Rio Grande at inlets <sup>5.2</sup> <sub>7½</sub> miles and 3 miles respectively, upstream from the Hidalgo gaging station. During 1934 there was no flood flow in these channels.

## INTERNATIONAL BOUNDARY COMMISSION

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## RIO GRANDE AT MATAMOROS STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car and winch located opposite Matamoros, Tamaulipas, Mexico, 53.3 miles upstream from the Gulf of Mexico. The water-stage recorder is attached to the central pier of the railroad bridge over the Rio Grande between Matamoros and Brownsville, Texas. The cable and car are located 0.3 mile upstream from the bridge. Zero of present gage is 15.26 feet above mean sea level, United States Coast and Geodetic Survey datum.

**Records:** Based on 148 meter measurements during the year.

Computations by shifting channel methods. 1934 records good

**Records Available:** 1901 to 1913; 1923 to Dec. 1934.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, as also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. Immediately above this station, particularly in Cameron and Hidalgo Counties, Texas, pumping plants divert annually large amounts of water. During floods, only a small part of the water discharges past this station through the channel of the Rio Grande, as the greater part finds outlet to the Gulf of Mexico through flood channels and floodways in both countries. The gage datum was lowered five feet on October 3, 1930. With all closed basins eliminated the drainage area above this station is 175,138 square miles; 94,677 being in the United States and 80,461 in Mexico.

**Previous Extreme Flows:** The greatest previous flow recorded here was on July 20, 1906, when a mean daily flow of 38,300 second feet occurred with a gage height of 13.39 feet. The highest gage reading was on September 12, 1925, when a reading of 21.63 present gage datum was reached. In 1930 the river at this station was dry for a few days in March and April. Numerous records of extreme flow may be seen in Water Bulletin No 1.

*Mean Daily Discharge in Second Feet and Annual Summary, 1934*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4,870	5,160	3,600	2,220	6,960	2,310	1,050	6,360	886	2,200	1,330	1,450
2	4,730	5,510	3,780	2,510	7,840	2,190	1,200	5,860	1,080	1,950	1,120	1,310
3	4,520	5,440	3,290	2,400	7,630	2,150	1,100	5,050	1,390	3,780	1,080	1,450
4	4,310	5,440	3,880	2,180	5,360	2,070	1,030	5,090	1,870	12,500	1,200	1,190
5	4,270	5,160	3,890	2,010	3,780	5,510	1,270	5,720	2,440	8,550	1,490	992
6	4,380	4,870	3,640	2,010	3,320	10,600	1,220	5,230	2,770	5,440	1,330	936
7	4,590	4,660	3,370	2,010	4,660	6,110	1,120	4,380	6,220	4,560	1,050	1,330
8	4,700	4,560	3,370	6,990	6,320	4,100	996	3,740	7,980	3,960	975	1,770
9	4,520	4,480	3,370	13,700	5,000	3,600	1,120	3,370	5,090	3,390	922	1,880
10	4,240	4,480	3,500	9,430	4,700	4,520	1,120	3,070	4,340	2,900	851	2,000
11	4,020	4,520	3,530	7,030	4,520	6,710	1,190	2,890	3,740	2,520	1,030	1,940
12	4,130	4,480	3,460	5,510	3,960	5,970	1,390	2,910	3,300	2,300	1,450	1,740
13	4,380	4,340	3,280	4,520	3,530	4,520	1,870	2,850	3,100	2,150	1,290	1,480
14	4,560	4,240	3,060	4,270	3,500	3,600	2,350	2,520	2,870	2,060	1,150	1,390
15	4,770	4,170	3,030	3,960	4,100	3,120	2,720	2,390	2,700	2,060	961	1,500
16	4,910	4,100	2,970	3,640	4,520	2,820	4,170	2,210	2,870	1,900	1,200	1,686
17	4,980	3,950	2,900	3,140	6,960	2,560	5,720	2,060	3,960	1,730	1,620	1,740
18	5,050	3,990	2,900	2,800	8,970	2,330	5,090	2,050	6,570	1,730	2,440	1,644
19	5,010	3,880	2,990	2,660	5,970	1,890	4,380	2,180	6,320	1,770	4,560	1,606
20	4,910	3,640	2,880	2,510	4,520	1,490	3,780	2,250	5,010	1,380	4,410	1,600
21	5,160	3,570	2,630	2,470	3,810	1,290	3,250	1,930	4,310	2,920	3,340	1,486
22	5,540	3,710	2,490	2,970	3,030	1,190	2,950	1,640	3,640	3,640	2,370	1,396
23	5,160	3,600	2,270	3,780	2,510	1,080	2,800	1,330	3,400	3,710	1,870	1,500
24	5,090	3,480	2,270	4,100	2,070	1,170	2,510	1,290	3,280	3,640	1,710	1,686
25	5,010	3,480	2,320	3,960	1,770	1,330	2,150	1,120	2,800	3,250	1,720	1,770
26	5,160	3,500	2,420	3,810	2,170	1,240	2,200	1,220	2,380	2,620	1,870	1,920
27	5,980	3,320	2,470	3,780	3,170	1,050	2,750	1,450	2,110	2,050	1,750	1,770
28	6,070	3,370	2,360	3,740	3,320	876	4,980	1,420	2,030	1,930	1,540	1,540
29	5,650	—	2,080	3,600	3,140	855	8,550	1,090	2,010	2,050	1,250	1,896
30	5,120	—	1,780	4,520	2,540	876	8,830	865	2,180	1,850	1,330	914
31	4,980	—	1,810	—	2,170	—	7,200	780	—	1,530	—	2,020

Month	Extreme Gage Height—Feet		Extreme Second Feet				Acre Feet		
			High		Low		Average Second Foot	Total	Per Sq. Mil.
	High	Low	Dates		Dates				
January.....	11.19	9.35	28	6,180	11	3,990	4,860	299,000	
February.....	10.89	8.37	2	5,540	27	3,250	4,250	236,000	
March.....	9.25	6.30	5	3,920	30	1,660	2,970	183,000	
April.....	15.03	6.56	9	14,900	5	1,910	4,070	242,000	
May.....	12.93	6.59	18	9,610	25	1,700	4,390	270,000	
June.....	14.07	5.09	6	12,300	28	802	2,970	177,000	
July.....	12.76	5.25	29	9,180	1	939	2,970	183,000	
August.....	11.45	4.79	1	6,710	31	763	2,780	171,000	
September.....	12.89	4.89	8	9,530	1	816	3,420	204,000	
October.....	13.62	5.81	4	13,300	31	1,380	3,180	195,000	
November.....	10.24	4.89	19	5,050	10	816	1,670	99,600	
December.....	6.69	5.09	31	2,050	6	918	1,610	98,700	
Yearly.....	15.03	4.79		14,900		763	3,260	2,358,300	13.5

## RIO GRANDE AT LOWER BROWNSVILLE STATION

**Description:** Automatic water-stage recorder and cable with sit-down cable car, located about 1000 feet below the El Jardin pumping plant and about 8.5 river miles below Brownsville, Texas. Zero of gage is U. S. C. and G. S. mean sea level datum.

**Records:** Based upon 17 current meter measurements made during the year. Computations by shifting channel methods. First four months estimated from Matamoros Station. 1934 records good for last eight months, fair for first four months.

**Records Available:** For the year 1934.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. Immediately above this station, particularly in Cameron and Hidalgo Counties, Texas, pumping plants divert annually large amounts of water. During floods only a small part of the water discharges past this station through the channel of the Rio Grande, as the greater part finds outlet to the Gulf of Mexico through flood channels and floodways in both countries. With all closed basins eliminated the drainage area above this station is 175,138 square miles; 94,677 being in the United States and 80,461 in Mexico.

**Previous Extreme Flows:** From records at El Jardin Pumping Plant, where the river gage datum is 1.11 feet above this gaging station datum, the maximum gage height at this station in recent years was 31.2 feet. This stage was reached during the floods of 1922, 1931 and 1932. The river was dry at this station a few days in 1930.

## Mean Daily Discharge in Second Feet and Annual Summary, 1934

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	*4,840	*5,190	*3,630	*2,220	†7,700	2,540	1,040	7,230	928	2,480	1,320	1,490	
2	*4,710	*5,540	*3,810	*2,450	†8,500	2,460	1,190	6,700	1,180	2,260	1,190	1,410	
3	*4,500	*5,470	*3,920	*2,330	†8,300	2,250	1,120	6,020	1,440	3,180	1,150	1,490	
4	*4,290	*5,460	*3,910	*2,130	†6,100	2,320	1,030	5,990	1,870	11,400	1,190	1,330	
5	*4,240	*5,150	*3,920	*1,980	*4,390	4,680	1,200	6,560	2,290	9,120	1,510 <sup>a</sup>	1,110	
6	*4,370	*4,900	*3,670	*1,970	3,680	12,000	1,210	6,320	2,600	6,140	1,420	1,080	
7	*4,590	*4,690	*3,340	*2,000	5,210	6,950	*1,130	5,090	5,610	5,160	1,140	1,320	
8	*4,680	*4,590	*3,370	*7,000	6,680	4,940	*1,020	3,980	9,120	4,490	1,040	1,710	
9	*4,490	*4,480	*3,400	*13,700	6,250	4,020	*1,120	3,500	6,190	3,700	978	1,860	
10	*4,230	*4,510	*3,530	*9,390	5,650	4,930	*1,150	3,070	4,790	3,070	950	1,980	
11	*4,050	*4,550	*3,560	*6,970	*5,450	7,190	1,180	2,860	3,770	2,600	1,030	1,910	
12	*4,140	*4,510	*3,490	*5,470	4,860	6,950	1,330	2,870	3,270	2,330	1,460	1,710	
13	*4,390	*4,370	*3,310 <sup>a</sup>	*4,510	4,190	5,500	1,710	2,860	2,990	2,210	1,400	1,500	
14	*4,590	*4,270	*3,060	*4,280	*4,140	4,180	2,070	2,530	2,750	2,110	1,300 <sup>a</sup>	1,430	
15	*4,770	*4,150	*3,020	*3,960	*4,640	3,360	2,460	2,320	2,700	2,130	1,080	1,480	
16	*4,940	*4,110	*2,960	*3,630	*5,010	3,080	3,960	2,130	2,750	1,960	1,160	1,640	
17	*5,010	*3,980	*2,910	*3,140	*7,280	2,790	6,200	1,980	3,740	1,800	1,560	1,740	
18	*5,080	*4,020	*2,930	*2,800	10,300	2,520	6,080	1,960	7,020	1,800	2,270	1,670	
19	*5,040	*3,910	*2,980	*2,650	7,550	2,060	5,040	2,090	7,440	1,830	4,450	1,570	
20	*4,940	*3,670	*2,870	*2,500	5,790	1,560	4,130	2,240	6,120	1,860	4,780	1,540	
21	*5,190	*3,600	*2,620	*2,470	4,690	1,320	3,510	2,020	4,910	2,690	3,080	1,490	
22	*5,530	*3,700	*2,470	*2,980	3,660	1,200	3,070	1,670	3,990	3,680	2,620	1,400	
23	*5,190	*3,610	*2,240	*3,750	*2,880	1,090	2,900	1,310	3,620	3,820	1,940	1,500	
24	*5,120	*3,510	*2,270	*4,090	*2,290	1,150	2,600	1,260	3,530	3,780	1,120	1,680	
25	*5,010	*3,510	*2,350	*3,950	1,900	1,290	2,270	1,150	3,100	3,360	1,750	1,760	
26	*5,160	*3,490	*2,420	*3,790	2,130	1,250	2,260	1,170	2,620	2,660	1,920	1,900	
27	*5,960	*3,310	*2,400	*3,750	3,340	1,110	2,720	1,340	2,300	2,080	1,820	1,810	
28	*6,100	*3,400	*2,310	*3,760	*3,750	*967	4,750	1,310	2,240	1,890	1,610	1,840	
29	*5,680	...	...	*2,040	*3,630	*3,400	*886	9,270	1,140	2,210	2,020	1,410	1,900
30	*5,150	...	...	*1,720	*4,550	2,710	929	10,300	911	2,370	1,890	1,390	1,980
31	*5,010	...	...	*1,800	...	*2,400	...	8,490	829	...	1,580	...	2,080

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet		
	High		High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	.....	.....	.....		.....	.....	.....	*4,870	*299,000	
February.....	.....	.....	.....		.....	.....	.....	*4,270	*237,000	
March.....	.....	.....	.....		.....	.....	.....	*2,980	*183,000	
April.....	.....	.....	.....		.....	.....	.....	*4,060	*242,000	
May.....	23.33	16.34	18	10,900	25	1,780	4,990	307,000		
June.....	24.33	14.56	6	13,400	30	874	3,250	193,000		
July.....	23.28	14.69	30	10,600	1	938	3,150	193,000		
August.....	21.94	14.28	1	7,670	31	809	2,980	183,000		
September.....	23.24	14.32	8	10,200	1	838	3,650	217,000		
October.....	24.07	15.47	4	12,600	31	1,400	3,260	200,000		
November.....	20.23	14.43	20	4,980	11	932	1,740	104,000		
December.....	16.53	14.53	31	2,120	6	1,020	1,620	99,800		
Yearly.....	24.33	14.28		13,400			809	3,390	2,457,800	

\* Partly Estimated

†Estimated.

**DIVERSIONS FROM RIO GRANDE BETWEEN UPPER AND LOWER  
PRESIDIO STATIONS, 1934**

There are 11 irrigation pumps which divert water from the Rio Grande between the Upper and Lower Presidio gaging stations. A record was kept of the operation of these pumps and their discharges were determined for the years 1932 and 1933.

The measured monthly diversions are shown below for the years 1932 and 1933 as well as the estimated diversions for 1934.

The difference between the discharge of the Rio Grande at Upper and Lower Presidio stations plus the diversions by these pumps gives the flow of the Rio Conchos which enters the Rio Grande between Upper and Lower Presidio stations.

*Monthly Diversions from Rio Grande Between Upper and Lower Presidio Stations*

Months	A C R E   F E E T		
	Measured 1932	Measured 1933	Estimated 1934
January	0	0	0
February	0	0	0
March	0	125	60
April	119	974	550
May	430	246	340
June	448	192	320
July	664	1,017	840
August	323	669	500
September	52.8	0	20
October	0	0	0
November	0	0	0
December	0	0	0
Yearly	2,036.8	3,223	2,630

## CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE - 1934

The chemical analyses reported here were made by the United States Department of Agriculture at Riverside, California, from water samples taken by the United States Section of the International Boundary Commission.

For the entire year at San Marcial each water sample was analyzed. The monthly figures in the table represent the mean for each month weighted according to the river flow at the time of sampling. For the entire year at El Paso, Ft. Quitman, Rio Grande City and Lower Brownsville a composite sample was made up for each month at each station. These composite samples were composed by using from each sample an amount proportional to the river flow at the time the sample was taken. This method reduced the analytical work and also improved the basis of estimating the salt burden passing each station by weighting according to river flow.

To convert "Milligram Equivalents" to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: HCO<sub>3</sub>, 61; Cl, 35.5; SO<sub>4</sub>, 48; Ca, 20; Mg, 12.15; Na, 23; NO<sub>3</sub>, 62.

Conductance, reported in the tables as ( $K \times 10^5$  at 25° C), is a relative measure of the total salt concentration in the water samples. (See Circular No. 232 U. S. Dept. Agr., July, 1932). It is a definite statement of an important physical property of the solution and is quite as valid and is probably more precise and more significant than is the statement of concentration in terms of total dissolved solids as parts per million.

## Water Samples from Rio Grande at San Marcial, New Mexico, 1934

Month	Tons of Salts		Mean Kx10 <sup>5</sup> @ 25°C	Total Salts p. p. m.	Bor- on p.p.m.	% Na ‡	% Cl **	Mean Milligram Equivalents							
	No. of Sam- ples	Per Acre Foot						Ca	Mg	Na	HCO <sub>3</sub>	SO <sub>4</sub>	Cl	NO <sub>3</sub>	
Jan.	5	.85	41,600	89.4	.626	.17	48	22	3.74	1.28	4.47	3.21	4.26	2.09	.01
Feb.	3	.80	37,100	84.5	.590	.16	49	21	3.69	1.02	4.18	3.31	3.92	1.88	.04
Mar.	5	.87	23,100	91.4	.637	.17	50	23	3.75	1.19	4.81	3.23	4.35	2.30	.02
Apr.	4	.94	27,600	103	.688	.19	45	21	4.25	1.58	5.10	3.28	5.06	2.29	.05
May	5	1.07	4,700	115	.785	.19	50	26	4.52	1.41	5.90	†3.38	5.39	3.12	Trace
June	2	*2.57	*587	275	*1,894	.22	51	20	10.80	4.98	15.97	4.85	20.85	6.07	.02
July††	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Aug.	1	1.66	52,800	165	1,225	..	42	12	7.93	2.58	7.68	4.62	11.69	2.18	Trace
Sept.	6	*1.57	*40,100	168	1,158	.25	49	15	6.84	2.20	8.77	†1.99	13.34	2.72	Trace
Oct.	4	1.77	1,520	195	1,300	.23	59	39	5.71	2.44	11.61	3.75	8.23	7.71	.01
Nov.	4	1.29	3,280	137	947	.24	50	24	5.19	1.85	7.22	3.71	6.83	3.59	.02
Dec.	4	1.03	28,700	111	.760	.21	45	19	4.77	1.61	5.31	3.65	5.63	2.27	.03
Total & Mean	43	1.07	261,087	139	*786	.20	49	22	5.56	2.01	7.37	3.54	8.14	3.29	.02

\* Weighted Mean.

\* Partly Estimated.

† Percent of total milligram equivalents of Ca, Mg, Na.

\*\* Percent of total milligram equivalents of HCO<sub>3</sub>, SO<sub>4</sub>, Cl, NO<sub>3</sub>

† Includes carbonate; May - .01; Sept. - trace; Oct. - .05.

†† No flow in July.

## Water Samples from Rio Grande at El Paso, Texas, 1934

Month	Tons of Salts		Mean Kx10 <sup>5</sup> @ 25°C	Total Salts p. p. m.	Bor- on p.p.m.	% Na ‡	% Cl **	Mean Milligram Equivalents							
	No. of Sam- ples	Per Acre Foot						Ca	Mg	Na	HCO <sub>3</sub>	SO <sub>4</sub>	Cl	NO <sub>3</sub>	
Jan.	5	1.96	21,000	203	1,440	.21	59	38	6.46	2.59	13.05	5.49	8.29	8.51	Trace
Feb.	4	1.22	40,400	125	.98	.18	51	28	4.77	1.67	6.66	†3.48	6.02	3.68	Trace
Mar.	4	1.26	54,900	129	928	.20	55	29	4.72	1.58	7.86	3.58	6.31	3.97	.04
Apr.	5	1.19	67,400	131	.874	.18	50	28	4.90	1.85	7.09	3.12	6.26	3.82	Trace
May	4	1.23	74,600	130	904	.19	50	28	4.77	1.85	6.47	3.36	6.01	3.75	.04
June	4	1.16	71,900	138	853	.48	48	33	5.20	1.61	6.45	3.29	5.39	4.36	Trace
July	5	1.19	87,700	128	.874	.34	50	28	4.74	1.70	6.51	3.69	5.95	3.84	.02
Aug.	4	1.14	91,800	126	842	.23	51	27	4.62	1.64	6.50	3.34	6.03	3.54	.01
Sept.	4	1.25	60,100	137	922	.18	51	29	5.12	1.81	7.20	3.59	6.47	4.08	.01
Oct.	5	1.68	30,800	187	1,238	.30	56	36	6.11	2.23	10.52	4.38	7.86	6.92	.01
Nov.	4	1.98	22,500	219	1,454	.28	59	39	6.49	2.72	13.35	5.02	8.87	8.78	.01
Dec.	5	1.98	19,000	221	1,455	.31	59	40	6.58	2.73	13.57	†4.87	8.87	9.31	.01
Total & Mean	53	1.26	643,000	156	930	.26	53	32	5.37	2.00	8.77	3.95	6.86	5.38	.01

\* Weighted Mean.

† Includes Carbonate as follows: Feb. - 0.10; Dec. - 0.20

‡ Percent of total milligram equivalents of Ca, Mg, Na.

\*\* Percent of total milligram equivalents of HCO<sub>3</sub>, SO<sub>4</sub>, Cl, NO<sub>3</sub>

## INTERNATIONAL BOUNDARY COMMISSION

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## Water Samples from Rio Grande at Fort Quitman, Texas, 1934

Month	No. of Samples	Tons of Salts		Mean Kx10 <sup>5</sup> @ 25°C	Total Salts p. p. m.	Bor-on p.p.m.	% Na ‡	% Cl **	Mean Milligram Equivalents						
		Per Acre Foot	Per Month						Ca	Mg	Na	HCO <sub>3</sub>	SO <sup>4</sup>	Cl	NO <sub>3</sub>
Jan.	4	2.99	37,400	341	2,201	.30	61	60	9.07	3.86	20.91	4.81	8.14	19.79	.04
Feb.	4	2.38	48,900	250	1,754	.28	53	49	7.71	4.38	13.26	4.22	8.86	12.62	Trace
Mar.	5	2.50	41,400	270	1,536	.28	61	52	7.79	3.02	16.72	4.07	9.13	14.45	.05
Apr.	4	3.38	26,300	395	2,438	.39	62	62	11.18	4.45	25.14	†3.68	11.79	25.55	.06
May	4	3.69	27,100	421	2,716	..	64	63	12.17	3.75	27.38	4.90	11.43	27.45	.07
June	5	3.63	16,300	406	2,639	..	62	63	10.67	4.73	25.09	3.29	11.69	25.04	.05
July	4	2.91	13,400	325	2,140	..	60	60	9.54	3.99	20.02	†2.95	10.38	20.41	
Aug.	5	3.37	14,900	381	2,476	.31	62	63	10.21	4.36	23.92	2.95	11.23	23.96	.01
Sept.	6	2.97	26,800	338	2,182	.30	60	58	9.75	3.82	20.68	3.64	10.47	19.89	.02
Oct.	4	4.22	19,100	477	3,102	.45	63	65	12.32	5.21	29.60	†3.29	13.29	30.93	.01
Nov.	5	3.94	19,700	446	2,898	.39	63	63	11.28	5.22	27.94	3.69	12.83	28.27	.01
Dec.	4	3.80	21,400	429	2,794	.43	62	62	11.89	4.81	26.90	4.23	12.57	26.94	.01
Total & Mean	54	3.05	312,700	374	2,245	.35	61	60	10.31	4.30	23.14	3.81	10.98	23.02	.03

† Weighted Mean

‡ Includes Carbonate as follows: April 0.10; July 0.39; Oct. - 0.39

§ Percent of total milligram equivalents of Ca, Mg, Na.

 \*\* Percent of total milligram equivalents of HCO<sub>3</sub>, SO<sub>4</sub>, Cl, NO<sub>3</sub>

## Water Samples from Rio Grande at Rio Grande City, Texas, 1934

Month	No. of Samples	Tons of Salts		Mean Kx10 <sup>5</sup> @ 25°C	Total Salts p. p. m.	Bor-on p.p.m.	% Na ‡	% Cl **	Mean Milligram Equivalents						
		Per Acre Foot	Per Month						Ca	Mg	Na	HCO <sub>3</sub>	SO <sup>4</sup>	Cl	NO <sub>3</sub>
Jan.	6	1.22	392,000	131	899	.21	45	40	4.97	2.45	6.06	3.14	4.83	5.31	.11
Feb.	6	1.08	261,000	129	794	.20	51	38	4.75	1.82	6.31	3.14	5.09	5.07	.11
Mar.	6	1.21	267,000	139	889	.22	46	39	4.77	2.90	6.53	2.69	5.87	5.47	.09
Apr.	4	1.07	363,000	124	785	.25	46	39	4.38	2.30	5.61	2.95	4.81	4.99	.06
May	5	.90	296,000	104	659	..	43	35	4.28	1.61	4.40	3.15	3.85	3.79	.04
June	5	1.90	526,000	218	1,401	.27	44	66	6.65	4.83	9.11	2.75	3.59	13.97	.71
July	6	.74	201,000	83.8	541	.25	40	28	3.45	1.56	3.36	2.66	3.63	2.50	.06
Aug.	5	.83	159,000	90.5	608	.21	39	26	3.85	1.63	3.57	†2.85	3.94	2.36	.07
Sept.	6	.69	182,000	78.4	509	.20	40	28	3.27	1.29	3.02	2.26	3.31	2.16	.07
Oct.	6	.72	181,000	80.4	528	.20	40	28	3.26	1.44	3.08	2.26	3.40	2.26	.05
Nov.	5	.92	143,000	103	674	.26	44	34	3.51	2.15	4.51	2.36	4.25	3.43	.07
Dec.	5	1.18	168,000	125	866	.28	46	36	4.23	2.62	5.74	2.61	5.39	4.57	.07
Total & Mean	65	1.04	3,139,000	117	767	.23	44	36	4.28	2.22	5.11	2.74	4.33	4.66	.13

† Weighted Mean

‡ Carbonate present.

§ Percent of total milligram equivalents of Ca, Mg, Na.

 \*\* Percent of total milligram equivalents of HCO<sub>3</sub>, SO<sub>4</sub>, Cl, NO<sub>3</sub>

## Water Samples from Rio Grande at Lower Brownsville Station, Texas, 1934

Month	No. of Samples	Tons of Salts		Mean Kx10 <sup>5</sup> @ 25°C	Total Salts p. p. m.	Bor-on p.p.m.	% Na ‡	% Cl **	Mean Milligram Equivalents						
		Per Acre Foot	Per Month						Ca	Mg	Na	HCO <sub>3</sub>	SO <sup>4</sup>	Cl	NO <sub>3</sub>
Jan.	5	*1.12	336,000	127	826	.22	42	36	4.94	2.66	5.59	3.18	5.13	4.73	.07
Feb.	4	*1.18	281,000	132	871	.22	45	37	5.04	2.54	6.15	3.08	5.41	5.07	.11
Mar.	5	*1.21	222,000	138	892	.27	46	39	4.78	2.82	6.41	3.05	5.74	5.59	.05
Apr.	4	*1.05	254,000	120	772	.24	46	39	4.32	2.17	5.50	2.76	4.70	4.89	.05
May	5	.87	266,000	105	637	.18	43	35	4.04	1.87	4.54	*2.75	4.14	3.79	.11
June	4	.89	172,000	101	657	..	43	33	4.10	1.70	4.39	3.20	3.77	3.44	.11
July	4	1.77	342,000	187	1,305	..	47	36	6.64	3.66	9.20	2.31	10.21	6.97	.05
Aug.	4	.90	165,000	97.9	663	..	43	30	3.93	1.65	4.17	2.61	4.29	2.95	.11
Sept.		*.78	*170,000												
Oct.	3	.66	133,000	76.1	488	.16	35	25	3.56	1.45	2.71	*2.56	3.02	1.88	.07
Nov.	3	.80	83,700	93.9	592	..	40	35	3.94	2.19	4.09	2.85	3.51	3.47	.07
Dec.	3	1.02	102,000	114	752	.26	44	33	4.14	2.42	5.07	2.71	5.05	3.87	.07
Total & Mean	44	1.03	2,527,000	117	756	.22	43	34	4.49	2.28	5.26	2.82	5.00	4.24	.08

† Weighted Mean

\* Party Estimated.

‡ Includes carbonate as follows: May - 0.39; August - trace.

§ Percent of total milligram equivalents of Ca, Mg, Na.

 \*\* Percent of total milligram equivalents of HCO<sub>3</sub>, SO<sub>4</sub>, Cl, NO<sub>3</sub>

**CHEMICAL AND BACTERIOLOGICAL ANALYSES OF WATER SAMPLES  
FROM THE RIO GRANDE AT NUEVO LAREDO, TAMAULIPAS**

The chemical and bacteriological analyses of water shown here were made by the Federal Board of Public Improvements at Nuevo Laredo, Tamaulipas, Mexico, from samples of water taken from the Rio Grande by means of the pumps of the city water service, under the supervision of such Board.

Month 1934	Chemical Analysis — Parts per Million					Bacteriological Analysis	
	Tur- bidity	Total Alkalinity	Phenolphtha- lein in Alkalinity	Hardness	Magnesia	Total Bac- teria per Sq. Cm. in Agar-Agar at 37.5° C.	Bacillus Coli Per 100 c. c.
<b>AVERAGE</b>							
January.....	71	149	7	323	30.1	445	283
February.....	40	137	7	309	27.5	168	77
March.....	32	135	6	308	24.5	94	62
April.....	274	128	5	281	24.4	2,474	307
May.....	461	129	4	243	15.9	2,877	263
June.....	1,322	123	4	229	14.6	4,416	251
July.....	530	117	4	218	16.7	20,228	1,837
August.....	1,202	181	7.4	310	30.3	7,977	2,907
September.....	1,115	111	5	193	32.2	10,015	3,578
October.....	498	112	5	208	29.3	4,581	1,113
November.....	312	127	5	248	31.0	2,921	608
December.....	73	139	4	274	35.0	414	76
Total.....	5,930	1,588	63.4	3,144	311.5	56,610	11,362
Average.....	494	132	5.3	262	25.9	4,717	947
Minimum.....	32	111	4	193	14.5	94	62
Maximum.....	1,322	181	7.4	323	35.0	20,228	3,578
<b>MINIMUM</b>							
January.....	25	131	6	297	17.4	93	10
February.....	25	132	5	279	22.3	83	10
March.....	30	130	5	266	11.6	26	5
April.....	30	86	2	206	11.6	128	10
May.....	125	101	2	211	4.4	248	10
June.....	45	69	1	97	2.9	123	10
July.....	25	92	1	142	7.0	130	13
August.....	73	100	4	120	2.0	85	10
September.....	61	63	2.5	111	15.6	230	50
October.....	47	75	2	110	8.0	275	10
November.....	48	75	0	120	8.0	140	50
December.....	26	115	0	220	12.0	81	5
<b>MAXIMUM</b>							
January.....	577	150	10	376	45.6	3,145	1,000
February.....	115	147	10	336	39.8	555	1,000
March.....	52	145	12	338	34.9	213	1,000
April.....	1,004	151	7	470	51.5	8,560	1,000
May.....	1,643	149	6	321	27.2	42,500	1,000
June.....	5,717	157	7	347	40.8	39,150	10,000
July.....	2,813	143	7	364	28.0	38,150	10,000
August.....	4,509	241	14	507	68.0	36,500	10,000
September.....	6,954	146	12.5	350	50.0	73,670	10,000
October.....	2,683	140	10	265	52.0	39,600	10,000
November.....	2,469	135	7	280	46.0	43,600	10,000
December.....	449	170	10	300	56.0	5,180	200

**SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES - 1934**

*Gravimetric Percentages of Dried Silt in the Rio Grande at San Marcial, New Mexico,  
as Determined from Water Samples During 1934*

The gravimetric percentages of dry silt reported here were determined by the United States Dept. of Agriculture at Riverside, California, from water samples taken by the United States Section of the International Boundary Commission in small necked bottles by lowering the open bottle into the water at one or more verticals in the stream cross section, being careful to approach but not to strike bottom.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely for visualization and comparison, the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds.

Date	% Silt								
Jan. 3	.635	Mar. 2	.556	May 2	.222	Sep. 1	5.304	Nov. 5	.017
Jan. 10	.755	Mar. 6	.526	May 8	.067	Sep. 4	7.899	Nov. 11	.110
Jan. 17	.720	Mar. 14	.324	May 14	.014	Sep. 9	2.884	Nov. 19	.086
Jan. 24	.949	Mar. 22	.140	May 23	.014	Sep. 18	4.903	Nov. 28	.705
Jan. 31	.558	Mar. 28	.062	May 29	.007	Sep. 24	.118		
Feb. 7	.539	Apr. 3	.124	June 4	8.315	Sep. 25	4.947	Dec. 4	.813
Feb. 14	.669	Apr. 10	.150			Sep. 30	2.594	Dec. 10	.610
Feb. 20	.488	Apr. 17	.804	Aug. 28	10,413	Oct. 9	.065	Dec. 19	.861
		Apr. 23	.255	Aug. 29	7,461	Oct. 15	.063	Dec. 27	.761
						Oct. 24	.015		
						Oct. 30	.003		

*Tons of Suspended Silt Passing San Marcial in the Rio Grande—1934*

Months	Tons of Water	SUSPENDED SILT		
		Tons	Average Percent by Weight	Acre Feet at 1,452 Tons Per Acre Foot
January.....	66,600,000	497,100	.7464	342.4
February....	63,060,000	352,600	.5592	242.8
March.....	36,370,000	137,300	.3775	94.6
April.....	40,180,000	172,200	.4286	118.6
May.....	6,060,000	8,400	.1386	5.8
June.....	310,000	14,200	4.5806	9.8
July.....	No Flow	0		
August.....	43,180,000	3,621,700	8.3874	2,494.3
September.....	34,730,000	1,616,200	4.6536	1,113.1
October.....	1,170,000	10,800	.9231	7.4
November.....	3,470,000	17,200	.4957	11.8
December.....	37,860,000	291,000	.7686	200.4
Yearly.....	332,990,000	6,738,700	2.0237	4,641.0

*Gravimetric Percentages of Dried Silt in the Rio Grande at Eagle Pass, Texas,  
as Determined from Water Samples During 1934.*

The gravimetric percentage of dry silt reported here were determined by the United States Department of Agriculture at Austin, Texas, from samples of Rio Grande water taken approximately every second day by the Mexican Section of the International Boundary Commission. The samples were taken in small necked bottles at three points at the surface of the stream, viz: at the mid-point, and at each side, one sixth of the width from the edge of the stream. Numerous experiments have shown that the mean of three samples so taken gives 9.08% of the mean suspended silt in the stream within reasonable limits of accuracy.

The daily figures were computed in accordance with the foregoing.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely for visualization and comparison, the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds.

Day.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.0000	.1744	.0903	.0120	.5830	.0338	.0230	.0126	.0039
2				.0000	.3407	.1265	.0140	.6754	†.0338	.0172	.0146	.0041
3				.0047	.2250	.1304	.0081	.6302	.6647	.0014	.0162	.0044
4				.0094	.1092	.1342	.0022	.5849	.4706	.0029	.0179	.0038
5				.0063	.1143	.4008	.0209	.4468	.2764	.0044	.0168	.0033
6				.0031	.1195	.6673	.0396	.3088	.2760	.0037	.0157	.0028
7				.0000	.1246	.9339	.0342	.2028	.2757	.0030	.0171	.0022
8				.0054	.2504	.8257	.0288	.0968	.2753	.0015	.0184	.0022
9				.0107	.3762	.7176	.0234	.0840	.1608	.0000	.0198	.0022
10				.0080	.3062	.6094	.0226	.0712	.0462	.0000	.0212	.0022
11				.0014	.2362	.3768	.0217	.0690	.0478	.0000	.0225	.0011
12				.0007	.1873	.1411	.0202	.0668	.0495	.0018	.0239	.0000
13				.0000	.1388	.2501	.0187	.0503	.0546	.0036	.0230	.0007
14				.0015	.0894	.3561	.0199	.0338	.0597	†.0036	.0220	.0014
15				.0029	.0665	.4114	.0211	.0318	.0563	†.0036	.0207	.0007
16				.0044	.0435	.4667	.0223	.0297	.0529	†.0036	.0195	0
17				.0034	.0206	.2900	.0157	.0340	.0495	.3817	.0182	0
18				.0024	.0239	.1133	.0091	.0882	.0416	.2230	.0162	0
19				.0014	.0272	.0847	.0139	.0358	.0338	.0644	.0143	0
20				.0049	.0212	.0561	.0187	.0333	.0408	.0399	.0134	0
21				.0083	.0151	.0386	.0253	.0319	.0478	.0154	.0124	0
22				.0118	.0168	.0211	.0319	.0305	.0432	.0142	.0115	0
23				.0129	.0184	.0036	.0385	.0214	.0385	.0129	.0105	0
24				.0140	†.0184	.0029	.0438	.0124	.0408	.0092	.0096	0
25				.0156	.1004	.0022	.0492	.0069	.0432	.0055	.0059	0
26				.0173	.1013	.0011	.1386	.0014	.1455	.0080	.0022	0
27				.0200	.1022	.0000	.2280	.0073	.2478	.0104	.0033	0
28				.0226	.1031	.0040	.2847	.0132	.1489	.0129	.0044	0
29				.0153	.0605	.0080	.3415	.0224	.0500	.0154	.0040	0
30				.0080	.0179	.0100	.3982	.0316	.0415	.0130	.0036	0
31				....	.0541	....	.4906	†.0316	....	.0107	....	0

*Tons of Suspended Silt Passing Eagle Pass in the Rio Grande During 1934*

Months 1934	Tons of Water	SUSPENDED SILT.		
		Tons	Average Percent by Weight	Acre feet at 1452 tons per acre foot
January*				
February*				
March*				
April.....	196,130,000	13,900	.0071	9.6
May.....	238,350,000	326,700	.1371	225.0
June.....	257,420,000	907,800	.3527	625.2
July.....	194,770,000	232,300	.1193	160.0
August.....	189,320,000	316,200	.1670	217.8
September.....	164,800,000	101,000	.0613	69.6
October.....	226,090,000	562,400	.2488	387.3
November.....	148,460,000	21,800	.0147	15.0
December.....	152,540,000	1,600	.0010	1.1
Yearly.....	1,767,880,000	2,483,700	.1405	1,710.6

\*Record began April 1, 1934

†Estimated.

~~Correction:~~

September.....	226,090,000	562,400	.2488	387.3
October.....	164,800,000	101,000	.0613	69.6

*Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas,  
as Determined from Water Samples During 1934*

The gravimetric percentages of dry silt reported here were determined by the United States Department of Agriculture at Austin, Texas, from samples of Rio Grande water taken daily by the American Section of the International Boundary Commission. The samples were taken in small necked bottles at three points at the surface of the stream, viz; at the mid-point, and at each side, one sixth of the width from the edge of the stream. Numerous experiments have shown that the mean of three samples so taken gives 0.908 of the mean suspended silt in the stream within reasonable limits of accuracy.

The daily figures were computed in accordance with the foregoing.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely for visualization and comparison, the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.0223	.0154	.0000	.0030	.1084	.0099	.0000	.1350	.0418	.2010	.0014	.0044
2	.0239	.0102	.0000	.0044	.0322	.0025	.0000	.1356	.0278	.2266	.0014	.0044
3	.0165	.0121	.0000	.0014	.0228	.0363	.0000	.0927	.0146	.3696	.0022	.0047
4	.0080	.0088	.0000	.0000	.1466	.4884	.0000	.0861	.0099	.1273	.0014	.0052
5	.0138	.0121	.0116	.0066	.1669	.2703	.0000	.0932	.S093	.0891	.0014	.0052
6	.0187	.0176	.0116	.6064	.1207	.1614	.0000	.0880	.9963	.0506	.0011	.0014
7	.0124	.0182	.0066	.5522	.0698	.1298	.0000	.0935	.4785	.0344	.0014	.0022
8	.0151	.0223	.0231	.2764	.0800	.2090	.0000	.1097	.2676	.0239	.0014	.0008
9	.0000	.0160	.0124	.0869	.0563	.1867	.0000	.1543	.1752	.0138	.0044	.0044
10	.0000	.0074	.0047	.0311	.0327	.3847	.0377	.1287	.1298	.0074	.0014	.0000
11	.0000	.0077	.0014	.0718	.0264	.3000	.0066	.1070	.1045	.0047	.0030	.0000
12	.0000	.0030	.0107	.0572	.0531	.1939	.0283	.1584	.0759	.0022	.0030	.0000
13	.0250	.0014	.0090	.0138	.0388	.1328	.0091	.1345	.0712	.0008	.0022	.0008
14	.0033	.0058	.0074	.0371	.0245	.1584	.0245	.0960	.0382	.0055	.0022	.0000
15	.0558	.0030	.0063	.0311	.5481	.1400	.0044	.0553	.0542	.0022	.0022	.0000
16	.0195	.0088	.0047	.0096	.2596	.0550	.0022	.0402	.8033	.0055	.3534	.0000
17	.0129	.0000	.0091	.0055	.0531	.0531	.0036	.0396	.3360	.4953	.4378	.0000
18	.0096	.0077	.0184	.0096	.0220	.0484	.0068	.0264	.2189	.0283	.2651	.0000
19	.0624	.0107	.0030	.0286	.0135	.0685	.0000	.0264	.0781	.0165	.1287	.0000
20	.0492	.0118	.0047	.0349	.0173	.0355	.0022	.0176	.0723	.0932	.0536	.0000
21	.0187	.0228	.0063	.0300	.0209	.0220	.0014	.0124	.0278	.0646	.0506	.0000
22	.0066	.0102	.0132	.0283	.0220	.0096	.0008	.0184	.0206	.0454	.0363	.0000
23	.0132	.0154	.0014	.0330	.0187	.0190	.0008	.0242	.0217	.0454	.0157	.0000
24	.1433	.0091	.0044	.0286	.0157	.0182	.0074	.0264	.0669	.0338	.0066	.0000
25	.0206	.0234	.0201	.0223	.0311	.0088	.0454	.0121	.0113	.0322	.0055	.0000
26	.0132	.0000	.0201	.0140	.0820	.0121	.1532	.0063	.0044	.0492	.0044	.0000
27	.0349	.0000	.0236	.1582	.0195	.0151	.5717	.0022	.0058	.0437	.0052	.0000
28	.0157	.0000	.0201	.2144	.0165	.0014	.2907	.0082	.0044	.0352	.0094	.1345
29	.0256	....	.0267	.1719	.0121	.0000	.2937	.0014	.0077	.0319	.0088	.0135
30	.0253	....	.0022	.3275	.0107	.0000	.2022	.0096	.0129	.0082	.0041	.0033
31	.0261	....	.0044	....	.0168	....	.1108	.0448	....	.0055	....	.0014

*Tons of Suspended Silt Passing Roma in the Rio Grande During 1934*

Months 1934	Tons of Water	SUSPENDED SILT		
		Tons	Average Percent by Weight	Acre ft. at 1,452 tons per acre ft.
January.....	298,280,000	73,700	.0247	50.8
February.....	241,070,000	24,300	.0101	16.7
March.....	236,990,000	21,500	.0091	14.8
April.....	325,520,000	538,100	.1653	370.6
May.....	298,280,000	276,700	.0928	190.6
June.....	344,590,000	639,000	.1854	440.1
July.....	257,420,000	337,500	.1311	232.4
August.....	213,830,000	164,300	.0768	113.2
September.....	266,950,000	868,900	.3255	598.4
October.....	222,010,000	243,900	.1089	168.0
November.....	172,970,000	162,000	.0937	111.5
December.....	155,270,000	10,000	.0064	6.9
Yearly.....	3,033,180,000	3,359,900	.1108	2,314.0

*Gravimetric Percentages of Dried Silt in the Rio Alamo at Mier, Tamaulipas, and in the Rio San Juan at Santa Rosalia, Tamaulipas, Mexico, as Determined from Water Samples During 1934*

The gravimetric percentages of dry silt reported here for two Mexican tributaries to the Rio Grande were determined by the Mexican Section of the International Boundary Commission from samples taken by that section. The samples were taken in small necked bottles at three points at the surface of the stream, viz: at the mid-point, and at each side, one sixth of the width from the edge of the stream. Numerous experiments have shown that the mean of three samples so taken gives 0.908 of the mean suspended silt in the stream within reasonable limits of accuracy. The computations below made in accordance with the foregoing.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely for visualization and comparison, the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 lbs.

*Silt in Rio Alamo — 1934*

Date	% Silt	Date	% Silt	Date	% Silt	Date	% Silt	Date	% Silt
Mar. 28	.004	Apr. 13	.006	Apr. 28	.668	May 15	1.216	Oct. 17	1.377
Apr. 6	.064	Apr. 18	.159	May 11	.015	Sep. 1	.013	Oct. 17	.681
Apr. 7	.348			May 12	.499				

*Tons of Suspended Silt Passing Ciudad Mier in the Rio Alamo — 1934*

Months	Tons of Water	SUSPENDED SILT			Acre Feet at 1,452 Tons Per Acre Feet
		Tons	Average Percent by Weight		
January.....	8,730,000	* 31,600	* 0.362		* 21.8
February.....	8,380,000	* 838	0.010		* .6
March.....	5,370,000	268	0.005		.2
April.....	36,370,000	144,000	0.396		99.2
May.....	13,240,000	42,800	0.323		29.5
June.....	2,630,000	605	0.023		.4
July.....	1,470,000	29	0.002		.0
August.....	538,000	5	0.001		.0
September.....	5,610,000	2,130	0.038		1.5
October.....	5,540,000	1,880	0.034		1.3
November.....	1,500,000	0	0		0
December.....	1,510,000	0	0		0
Yearly.....	90,888,000	224,155	0.247		154.5

*Silt in the Rio San Juan — 1934*

Date	% Silt	Date	% Silt	Date	% Silt	Date	% Silt
April 7	1.011	June 2	trace	Aug. 1	.018	Sep. 17	trace
April 20	0.026	June 15	trace	Aug. 15	trace	Oct. 2	.502
May 16	0.344	July 2	trace	Aug. 31	trace	Oct. 15	trace
		July 14	0.436				Nov. 16
							Nov. 30
							Dec. 17

*Tons of Suspended Silt Passing Santa Rosalia in Rio San Juan — 1934*

Months	Tons of Water	SUSPENDED SILT			Acre Feet at 1,452 Tons Per Acre Feet
		Tons	Average Percent by Weight		
January.....	127,350,000	* 16,600	* 0.013		* 11.4
February.....	87,170,000	* 2,620	* 0.003		* 1.8
March.....	54,620,000	0	.0		0
April.....	134,160,000	63,100	0.047		43.5
May.....	134,020,000	111,200	0.083		76.6
June.....	28,330,000	0	.0		0
July.....	101,470,000	26,400	0.026		18.2
August.....	37,180,000	372	0.001		.3
September.....	80,630,000	4,840	0.006		3.3
October.....	113,590,000	132,900	0.117		91.5
November.....	33,780,000	0	0		0
December.....	29,010,000	0	0		0
Yearly.....	961,310,000	358,032	0.037		246.6

\*Estimated

## STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

From the records of the United States Reclamation Bureau, the following data are taken for Elephant Butte reservoir on the Rio Grande, and for the McMillan and Avalon reservoirs on the Pecos river, all in New Mexico. The data for Boquilla reservoir on the Rio Conchos in Chihuahua is taken from the records of the "Compañía Agrícola y de Fuerza Eléctrica del Río Conchos S. A." and that for Don Martin reservoir on the Rio Salado is from the records of the National Irrigation Commission of Mexico.

The monthly figures represent the number of acre feet of water in storage on the last day of each month, and the normals represent the averages for the years 1924 to 1933 inclusive, except Don Martin, where storage began with 1930. For previous years records see Water Bulletin No. 2.\*

Month	Elephant Butte		McMillan & Avalon		Boquilla			Don Martin	
	Thousands of Ac. Ft		Acre Feet		Thousands of Ac. Ft.		Acre Feet		
	1934	Normal	1934	Normal	*1933	1934	Normal	1934	Normal
January.....	1,164	1,259	26,600	41,250	1,598	1,902	1,306	981,150	714,070
February.....	1,151	1,265	25,500	39,990	1,631	1,885	1,280	966,550	711,110
March.....	1,102	1,238	25,000	34,760	1,583	1,755	1,223	895,950	639,200
April.....	1,002	1,231	13,900	22,880	1,525	1,684	1,158	890,300	695,510
May.....	897	1,339	14,300	28,100	1,454	1,598	1,085	857,800	677,710
June.....	772	1,328	2,200	22,160	1,453	1,486	1,027	772,960	636,900
July.....	639	1,238	0	19,520	1,539	1,412	1,057	719,110	681,790
August.....	518	1,154	0	20,880	1,723	1,357	1,205	607,490	677,130
September.....	492	1,126	0	28,150	2,133	1,299	1,322	610,800	781,960
October.....	495	1,133	430	35,140	2,091	1,230	1,320	583,630	803,070
November.....	493	1,136	7,900	35,830	2,035	1,172	1,267	550,440	824,090
December.....	502	1,152	7,900	37,330	1,971	1,128	1,247	542,200	823,780
Change.....	-623	....	-17,400	....	+398	-843	....	-434,580	....

\*The Mexican Section revises here the figures in Water Bulletin No. 3 for 1933 for Boquilla reservoir.

## EVAPORATION FROM FREE WATER SURFACES IN THE RIO GRANDE BASIN

The evaporation reported below is in inches from land pans. For details of pans at each station and prior years records since 1924, also sources of records, see Water Bulletin No. 3. The stations at Dilley and Winterhaven, Texas, are not in the Rio Grande basin, but their records are reproduced here because of their proximity to the east side of the basin and the lack of records within the basin in the same region.

Month	Elephant Butte		Mesilla Park		Balmorhea		Winterhaven	
	1934	1924-1934 Normal	1934	1924-1934 Normal	1934	1926-1934 Normal	1934	1931-1934 Normal
January.....	3.29	2.56	3.22	2.85	2.78	2.66	1.82	1.80
February.....	5.23	4.08	4.99	4.38	3.75	3.74	2.99	2.40
March.....	8.57	7.18	7.76	7.38	5.32	5.48	5.12	4.85
April.....	11.27	9.36	11.12	9.18	6.40	6.55	5.64	5.31
May.....	14.78	11.78	12.93	11.05	8.24	7.84	7.40	6.56
June.....	17.48	13.50	14.54	11.95	9.33	8.32	10.05	8.54
July.....	16.69	11.69	14.94	10.96	8.61	8.02	9.53	8.58
August.....	14.08	10.13	13.10	9.53	7.72	7.17	9.07	8.02
September.....	11.30	8.56	10.48	8.06	6.59	5.77	6.85	6.31
October.....	8.29	6.39	7.21	5.87	5.14	4.42	5.16	4.95
November.....	4.94	3.91	4.68	3.75	3.37	3.17	3.86	3.48
December.....	2.70	2.43	2.82	2.57	2.15	2.19	1.82	1.96
Yearly.....	118.62	91.57	107.79	87.53	69.40	65.33	69.31	62.76

Month	Dilly		Don Martin		Monterrey		Saltillo		Weslaco	
	1934	1928-1934 Normal	1934	*1927-1934 Normal	1934	*1924-1934 Normal	1934	*1929-1934 Normal	1934	1932-1934 Normal
January.....	2.78	2.79	3.53	3.53	3.59	7.20	5.31	2.00	2.56	
February.....	4.11	3.45	5.17	4.58	3.80	4.28	7.67	5.14	3.12	3.22
March.....	6.22	6.03	9.34	8.30	6.33	5.70	8.55	7.75	4.25	4.81
April.....	7.07	7.19	8.64	9.68	5.94	6.18	7.08	9.11	5.21	5.36
May.....	9.52	8.14	12.03	11.53	7.97	7.13	9.12	9.83	5.90	6.16
June.....	11.44	9.96	15.84	13.66	9.71	8.27	8.88	10.26	7.44	7.16
July.....	11.50	10.89	14.22	13.67	8.26	8.82	5.59	8.87	6.55	6.44
August.....	10.91	10.37	14.11	13.50	8.20	7.83	9.19	9.62	6.68	6.84
September.....	7.95	7.62	10.25	9.61	5.18	4.64	6.50	7.67	3.39	3.91
October.....	5.77	6.01	7.81	7.06	4.93	4.08	7.37	6.76	4.55	4.74
November.....	4.26	3.57	6.54	4.75	4.06	3.59	6.20	5.64	3.94	3.67
December.....	2.62	2.66	3.63	3.39	2.80	3.08	4.11	6.00	2.14	2.59
Yearly.....	84.15	78.68	107.58	103.26	67.18	67.19	87.46	91.96	55.17	57.46

\*For missing months in previous records see Water Bulletin No. 3.

## RIO GRANDE AT UPPER PRESIDIO STATION

More complete information has shown that the following corrections are needed in the discharge records of this station as previously estimated and published in Water Bulletin No. 3 for the Year 1933.

Days 1933	Mean Daily Second Feet	Period 1933	Total Acre Feet	Average Second Feet	Acre Feet per square mile
June 28.....	750				
June 29.....	900	June.....	14,590	245	
June 30.....	1,100	July.....	20,000	325	
July 1.....	1,150				
July 2.....	900	Yearly.....	182,340	252	4.86
July 3.....	620				

## FLOW OF THE RIO GRANDE AND TRIBUTARY CONTRIBUTIONS

*From San Marcial New Mexico, to the Gulf of Mexico,  
For the Years 1924 to 1928, Inclusive*

The records of discharge of the Rio Grande and of tributaries near their confluence at gaging stations mentioned in the first tabulation below have all been studied as synchronized discharge hydrographs in the light of known normal river losses and gains between stations and in the light of the original records where available. Adjustments have accordingly been made in the records shown in the second table below and in the following pages. The records found to be correct and those adjusted as shown in the first tabulation below now form a consistent whole.

Name of Station	Where formerly published	Found to be correct	Adjusted and published in following pages	Records for the years (inclusive)
Fort Quitman.....	W. S. Papers*	yes		1924 - 1928
Upper Presidio.....	W. S. Papers	yes		1924 - 1925
Upper Presidio.....	W. S. Papers		yes	1926
Upper Presidio.....	not published		yes	1927 - 1928
Lower Presidio.....	W. S. Papers		yes	1924 - 1926
Lower Presidio.....	not published		yes	1927 - 1928
Boquillas.....	W. S. Papers	yes		1928
Langtry .....	W. S. Papers	yes	yes	1924 - 1927
Langtry .....	W. S. Papers	yes		1928
Pecos .....	W. S. Papers	yes		1924 - 1928
Devils .....	W. S. Papers	yes		1924 - 1928
Del Rio.....	W. S. Papers		yes	1924
Del Rio.....	W. S. Papers	yes		1925 - 1928
Pinto .....	W. S. Papers	yes		1928
Eagle Pass.....	W. S. Papers		yes	1924 - 1926
Eagle Pass.....	W. S. Papers	yes		1927 - 1928
Laredo.....	W. S. Papers		yes	1924 - 1926
Laredo.....	not published		yes	1927 - 1928

\*U. S. G. S. Water Supply Papers.

†See Table Below.

## RIO GRANDE AT DEL RIO STATION

The record for this station for 1924 as published in United States Geological Survey Water Supply Papers Nos. 588 and 608 is correct except as modified here. Station description etc., may be seen in the above mentioned Water Supply Papers.

Days 1924	Mean Daily Second Feet	Period 1924	Total Acre Feet	Average Second Feet	Acre Feet per Square Mile
Feb. 21.....	4,200	Feb.....	192,000	3,330	
Feb. 22.....	3,700	Mar.....	194,000	3,160	
Feb. 23.....	3,500				
Feb. 24.....	3,700	Yearly.....	2,340,000	3,220	19.0
Mar. 10.....	3,300				

## RIO GRANDE AT UPPER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located 1 mile from Haciendita, Texas, 8 miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Ojinaga, Chihuahua, and Presidio, Texas. Zero of gage is 2,579.40 feet above mean sea level, International Boundary Commission datum.

**Records:** Based on frequent meter measurements. Computations by shifting channel methods. 1926 records fair.

**Remarks:** River flow is greatly modified at this station by Elephant Butte reservoir and diversions for irrigation in both the United States and Mexico. This station was operated by the Chihuahua Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated, the drainage area above this station is 37,488 square miles, of which 35,229 are in the United States and 2,259 in Mexico.

## Mean Daily Discharge in Second Feet and Annual Summary, 1924-1926

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	325	290	255	330	620	1,625	510	1,275	900	3,200	300	335
2	330	285	285	640	670	1,400	505	1,525	1,000	3,150	375	340
3	325	280	310	1,050	745	1,475	500	1,450	1,150	2,380	375	320
4	335	280	305	950	660	1,500	495	1,350	730	3,400	380	315
5	340	275	280	760	985	2,500	500	1,125	495	2,500	390	310
6	365	270	265	640	1,650	1,525	575	1,025	400	2,250	400	315
7	380	270	295	570	1,225	1,275	1,025	1,000	280	2,100	430	345
8	395	270	330	325	1,200	1,325	780	975	375	1,900	480	340
9	385	255	285	450	1,275	1,325	960	950	270	1,780	540	315
10	395	250	275	365	1,475	1,600	1,000	755	240	1,150	515	330
11	440	260	260	345	1,925	1,375	830	550	205	1,050	560	345
12	460	300	250	310	1,750	1,150	800	640	150	1,000	540	360
13	455	315	245	270	1,500	1,100	1,400	640	115	1,150	500	395
14	450	285	230	265	1,125	1,025	1,300	675	100	1,180	480	400
15	450	255	235	370	960	920	1,150	1,075	95	1,100	465	415
16	440	255	215	435	885	825	1,300	890	280	1,050	415	415
17	425	245	210	810	790	750	1,400	1,000	1,250	1,000	400	415
18	385	240	205	1,000	875	710	1,475	2,375	2,100	820	400	400
19	355	235	200	1,150	680	890	1,625	2,300	1,200	750	390	385
20	345	230	195	1,025	575	890	1,675	1,525	950	700	375	375
21	325	225	195	910	525	740	1,775	1,200	830	630	355	380
22	330	225	310	980	490	655	1,650	1,800	760	610	330	395
23	335	215	350	920	475	595	1,550	3,000	695	600	325	375
24	320	200	330	890	465	560	1,450	2,775	660	570	320	345
25	315	195	315	765	470	635	1,525	2,200	630	525	315	340
26	310	190	335	765	580	575	1,400	1,850	1,200	520	320	330
27	305	185	345	580	450	575	1,050	1,250	1,375	490	315	330
28	310	180	350	695	415	615	1,200	1,200	930	470	320	320
29	305	...	350	670	395	610	1,200	990	1,800	460	355	315
30	300	...	290	635	620	570	1,025	860	2,300	440	375	315
31	310	...	285	...	1,400	...	1,050	965	...	415	...	315

Month	Mean Daily Gage Height—Feet		Mean Daily Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Per Sq. Mile
	High	Low	Dates		Dates				
January.....	6.88	6.37	12	460	30	300	363	22,300	
February.....	6.52	5.80	13	315	28	180	249	13,800	
March.....	6.29	5.66	23	350	20	195	277	17,000	
April.....	7.45	5.85	19	1,150	14	265	673	39,900	
May.....	8.78	5.75	11	1,925	29	395	900	55,300	
June.....	9.40	6.31	5	2,500	24	560	1,040	62,100	
July.....	8.86	6.29	21	1,775	4	495	1,120	68,800	
August.....	10.15	6.45	23	3,000	11	550	1,330	81,700	
September.....	9.95	5.45	30	2,300	15	95	782	46,500	
October.....	10.39	6.27	4	3,400	31	415	1,270	78,000	
November.....	6.85	5.89	10	575	27	315	406	24,200	
December.....	6.42	6.03	16	415	5	310	353	21,700	
Yearly.....	10.39	5.45		3,000		95	734	531,300	14.2

## RIO GRANDE AT UPPER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located 1 mile from Haciendita, Texas, 8 miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Ojinaga, Chihuahua, and Presidio, Texas. Zero of gage is 2,579.40 feet above mean sea level, International Boundary Commission datum.

**Records:** Based on frequent meter measurements.

Computations by shifting channel methods. 1927 records fair.

**Remarks:** River flow is greatly modified at this station by Elephant Butte reservoir and diversions for irrigation in both the United States and Mexico. This station was operated by the Chihuahua Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated, the drainage area above this station is 37,488 square miles, of which 35,229 are in the United States and 2,559 in Mexico.

## Mean Daily Discharge in Second Feet and Annual Summary, 1927

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*310	*110	*120	67	*120	*80	*130	165	794	1,060	276	432
2	*260	*110	*110	64	*135	*90	*130	737	690	831	259	441
3	*220	*110	*100	56	*110	*105	*150	677	652	677	250	441
4	*210	*110	*90	57	82	*135	*150	927	598	658	248	432
5	*190	*110	*75	55	63	*175	*125	1,250	548	640	237	424
6	*190	*110	*75	42	50	*155	*110	794	468	628	371	407
7	*210	*110	*75	38	37	*130	*95	548	432	737	428	394
8	*210	*130	*75	37	32	*95	*85	483	379	690	598	338
9	*205	*190	*15	37	111	*85	*70	468	356	1,220	652	321
10	203	*200	*75	77	124	*90	*55	424	345	416	622	311
11	217	*210	*75	97	89	*125	35	403	331	403	604	298
12	219	*230	*100	106	65	*165	22	403	259	379	598	285
13	208	*250	*130	80	71	*180	12	395	327	371	598	276
14	202	*240	*150	73	118	*155	16	371	1,200	455	598	270
15	181	*230	*165	86	210	*135	12	403	634	468	543	264
16	167	*230	*165	74	240	*150	11	1,740	450	533	522	276
17	165	*240	*150	55	198	*180	11	2,350	432	616	502	276
18	154	*250	*140	41	149	*240	41	407	437	522	468	264
19	145	*250	*130	36	134	*340	28	497	866	415	415	253
20	136	*250	*120	33	*110	*460	18	464	979	382	382	248
21	130	*230	*115	30	*115	*390	10	394	1,620	371	363	352
22	124	*210	111	91	*130	*150	5	382	1,330	363	327	522
23	123	*200	93	177	105	*350	2	415	894	383	282	487
24	122	*190	87	181	89	*340	0	652	758	403	262	282
25	122	*170	53	177	63	*320	0	345	604	386	341	190
26	117	*160	51	160	*55	*300	0	307	1,060	363	598	161
27	116	*150	74	137	*60	*260	0	295	1,220	345	640	159
28	114	*130	79	114	*70	*220	0	338	1,600	360	538	145
29	111	....	79	111	*100	*175	154	854	1,420	383	507	117
30	110	....	76	95	*105	*140	92	816	1,190	360	468	169
31	110	....	71	....	*85	....	59	604	....	345	....	338

Month	Mean Daily Gage Height—Feet		Mean Daily Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates	Dates	Dates	....				
January.....	....	....	1	*310	30	110	171	10,500		
February.....	....	....		*250		*110	182	10,100		
March.....	....	....		*165	26	*51	99.5	6,120		
April.....	6.01	4.63	24	181	21	30	82.8	4,930		
May.....	6.26	4.68	16	240	8	32	104	6,400		
June.....	....	....	20	*460	1	*80	204	12,100		
July.....	5.87	....	29	154		0	52.5	3,230		
August.....	8.72	5.93	17	2,350	1	165	623	38,300		
September.....	8.26	6.33	21	1,620	12	259	763	45,400		
October.....	7.93	6.60	9	1,220	27	345	521	32,100		
November.....	7.24	6.25	9	652	5	237	450	26,800		
December.....	7.01	5.64	22	522	29	117	309	19,000		
Yearly.....	8.72	....	...	2,350		0	297	214,980	5.73	

\* Partly Estimated

## INTERNATIONAL BOUNDARY COMMISSION

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## RIO GRANDE AT UPPER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located 1 mile from Haciendita, Texas, 8 miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Ojinaga, Chihuahua, and Presidio, Texas. Zero of gage is 2,579.40 feet above mean sea level, International Boundary Commission datum.

**Records:** Based on frequent meter measurements during the year. Computations by shifting channel methods. 1928 records fair.

**Remarks:** River flow is greatly modified at this station by Elephant Butte reservoir and diversions for irrigation in both the United States and Mexico. This station was operated by the Chihuahua Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated, the drainage area above this station is 37,488 square miles, of which 35,229 are in the United States and 2,259 in Mexico.

## Mean Daily Discharge in Second Feet and Annual Summary, 1928

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	234	205	176	37.5	72.9	82.8	^	.0	1,850	^	^	^
2	223	202	152	31.8	197	82.2		36.0	1,320			
3	222	202	130	18.2	232	85.1		177	1,030			
4	218	202	119	11.6	273	81.6		337	1,350			
5	214	198	130	11.0	316	80.5		571	841			
6	211	195	112	10.2	327	76.0		583	620			
7	205	185	125	9.7	351	72.9		694	498			
8	202	179	107	9.4	450	65.0		537	492			
9	200	179	80.9	9.4	832	57.9		1,210	730			
10	193	176	72.3	*90	1,020	53.8		688	849			
11	179	173	62.1	*200	788	50.7		726	595			
12	173	182	58.7	*250	466	47.8		688	708			
13	173	188	55.4	*300	332	45.0		929	467			
14	172	192	55.4	*400	572	43.0		852	211			
15	173	202	54.3	*440	832	41.1	43	589	124	348	435	302
16	171	212	51.3	*470	823	41.7		996	83			
17	171	231	49.3	*450	691	39.9		3,250	80			
18	178	248	49.3	*380	755	54.6		5,750	77			
19	179	235	49.3	*380	788	78.2		2,370	75			
20	166	222	72.3	*480	618	62.2		1,000	67			
21	153	220	48.4	*500	482	45.0		867	70			
22	142	216	38.2	*470	331	43.0		874	79			
23	138	220	41.4	*350	226	43.0		794	80			
24	139	231	58.7	*230	190	49.9		733	75			
25	135	235	115	*150	152	41.7		2,050	242			
26	156	231	112	*100	148	25.7		4,010	620			
27	239	227	115	*145	715	41.1		2,970	424			
28	236	248	119	*210	92.3	36.9		844	245			
29	221	216	105	*300	90.0	34.2		700	627			
30	222	...	82.4	*200	85.1	31.1		822	482			
31	222	...	58.7	...	83.9	....	V	1,200	...	V	V	V

Month	Mean Daily Gage Height—Feet		Mean Daily Second Feet				Average Second Feet	Acre Feet		
	High		High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	7.08	5.80	27	239	25	135	189	11,600		
February.....	7.01	6.80	18	248	11	173	209	12,000		
March.....	6.81	5.99	1	176	22	38.2	85.7	5,270		
April.....	...	5.52	21	*500	8	9.4	221	*13,200		
May.....	8.39	6.23	10	1,020	1	72.9	432	26,500		
June.....	6.34	5.54	3	85.1	26	25.7	54.5	3,240		
July.....	...	...	†*2,500			...	43.0	2,640		
August.....	11.09	5.54	18	5,750	1	0	1,220	75,200		
September.....	9.38	6.36	1	1,850	20	67	500	29,800		
October.....	...	...	†*1,500			...	348	21,400		
November.....	...	...	†*1,000			...	435	25,900		
December.....	...	...	†*800			...	302	18,600		
Yearly.....	...	...		5,750		0	338	245,350	6.54	

† Maximum during month did not exceed these discharges.

\* Partly Estimated

## RIO GRANDE AT LOWER PRESIDIO STATION

**Description:** Prior to June 18 a staff gage; after that an automatic water stage recorder, also a cable near gage.

**Records:** Based upon frequent meter measurements. 1924 records poor.

**Remarks:** For other details see page 56 hereof.

## Mean Daily Discharge in Second Feet and Annual Summary, 1924

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*6,200	▲	*1,700	*1,500	▲	*1,800	*1,050	*1,500	▲	*2,500	▲	▲
2	*6,000		*1,700	▲		*1,680	*1,050	*2,000		*3,000		
3	*5,900		*1,700			*1,200	*1,600	*1,050	*1,700	2,300	*4,000	
4	*5,800		*1,700				*1,500	*1,050	*1,450		*4,000	
5	*5,100		*1,700					*1,200	*1,200			*4,000
6	*4,600	*1,600	*1,700	*1,300	*1,750	*1,320	*1,200	*1,000		*3,300		
7	*4,300		*1,700			*1,620	*1,250	*1,200	*980	✓	*2,700	
8	*4,000		*1,650	▼		*1,500	*1,180	*1,200	*960	▲	*2,250	
9	*3,800		*1,550			*1,280	*1,500	*1,100	*1,300			▲
10	*3,500					*1,270	*1,500	▲	*1,400			
11	*3,300					*1,260	*1,750	*1,500	*890			
12	*3,100					*1,250	*1,750	*1,600	*870	*1,200	*1,850	*1,300
13	*2,900		*1,800			*1,240	*1,750	*1,750	*850			
14	*2,700		*2,000			*1,230	*1,750	*2,200	*840			
15	*2,550		*2,300			*1,220	*1,750	*2,700	*820			
16	*2,400	*2,700				*1,210	1,750	*2,500	*800	2,300	▼	
17	*2,250	*2,300				*1,210	1,600	▲	*780	2,680	▼	
18	*2,100	*2,000					1,480		*770	4,220	▲	
19	*2,100	*1,950							*750	4,770		
20	*2,100	*1,900							*730	3,710		
21	*2,100	*1,800	*1,500	*1,200	*1,250	*1,050	*2,300	*720	3,450			
22	*2,000	*1,750						*700	*3,000			
23	*1,900	*1,700						▼	*790	*2,750		
24	*1,900	*1,700							*900	▲		
25	*1,900	*1,700							*2,000	*900		
26	*1,900	*1,700						*2,000	*900	*2,500	*1,450	
27	*1,900	*1,700						*2,000	*900			
28	*1,750	*1,700						*2,500	*1,700	1,200		
29	*1,600	*1,700						*3,000	*1,650	1,380	▼	
30	*1,600	...						*2,300	...	*1,600	2,480	▼
31	*1,600	...						*1,800	...	*1,550	*2,300	...

Month	Mean Daily Gage Height—Feet			Mean Daily Second Feet			Average Second Feet	Acre Feet			
	High		Dates	High		Low		Total	Per Sq. Mile		
	High	Low		Dates	Dates						
January.....	....	....	1	*6,200			*1,600	*3,060	*188,000		
February.....	....	....	16	*2,700			*1,600	*1,780	*102,000		
March.....	....	....		*1,700			*1,500	*1,550	*95,400		
April.....	....	....	1	*1,500			*1,200	*1,250	*74,100		
May.....	....	....	29	*3,000			*1,200	*1,560	*95,800		
June.....	....	....	1	*1,800			*1,050	*1,160	*69,200		
July.....	....	....	15	*2,700			*1,050	*1,770	*109,000		
August.....	....	....	30	2,480	22		*700	*1,090	*61,200		
September.....	....	....	19	4,770			*2,000	*2,550	*152,000		
October.....	....	....		*4,000			*1,450	*2,040	*125,000		
November.....	....	....		*1,300			*1,300	*1,300	*77,400		
December.....	....	....		*1,300			*1,300	*1,300	*79,900		
Yearly.....	....	....		*6,200			*700	*1,700	*1,235,000	*20.4	

\* Partly Estimated

## RIO GRANDE AT LOWER PRESIDIO STATION

**Description:** Same as shown at page 56 hereof.**Records:** Based upon frequent meter measurements. 1925 records poor.**Remarks:** For other details see page 56 hereof.*Mean Daily Discharge in Second Feet and Annual Summary, 1925*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,100	1,225	1,650	1,075	915	2,025	5,600	2,950	6,600	^	^	^
2	1,075	1,275	1,675	1,100	900	1,925	4,400	2,825	7,375			
3	1,050	1,275	1,650	*1,050	945	1,975	4,000	3,500	9,300	*3,000	*2,600	
4	1,100	1,300	1,600	1,000	970	2,000	3,750	7,575	12,200			
5	1,100	1,325	1,600	1,025	960	2,000	3,750	9,200	13,750			
6	1,075	1,300	1,575	1,075	940	2,075	4,225	7,650	17,500			
7	1,100	1,275	1,425	1,050	1,825	2,000	3,825	9,400	18,250	V		
8	1,125	1,275	1,500	1,025	1,975	1,975	4,625	12,500	16,000	A		
9	1,075	1,300	1,550	980	1,050	1,875	6,650	13,100	17,250			
10	1,075	1,300	1,475	975	1,075	1,750	7,750	12,500	15,200			
11	1,100	1,325	1,450	1,000	990	1,725	5,750	14,000	13,000			
12	1,100	1,350	1,450	1,050	950	1,675	5,300	12,800	12,000			
13	1,050	1,325	1,350	1,050	1,150	1,550	6,250	13,200	10,500			
14	1,050	1,325	1,325	1,000	1,050	1,525	4,400	11,900	9,000			
15	1,075	1,375	1,350	950	950	1,525	*4,000	10,800	7,900			
16	1,050	1,400	1,375	800	900	1,500	*4,000	9,600	7,150	*6,000	*2,000	*1,850
17	1,050	1,450	1,375	880	925	1,475	*4,000	9,200	6,450			
18	1,050	1,550	1,400	870	945	1,650	*4,000	8,600	5,700			
19	1,050	1,525	1,350	880	955	1,575	*4,000	8,300	5,400			
20	1,175	1,425	1,225	900	955	1,475	*2,400	8,100	5,375	V	A	
21	1,150	1,400	1,150	910	930	1,450	*2,400	7,200	5,200			
22	1,175	1,450	1,250	*4,000	910	1,425	*2,400	6,400	5,150			
23	1,125	1,475	1,200	*2,500	895	1,400	*2,400	6,350	*4,500	V		
24	1,125	1,525	1,275	*1,500	1,050	1,375	*2,400	7,125	*4,500	A		
25	1,150	1,500	1,250	*1,300	*3,000	2,000	*2,400	7,350	*4,500			
26	1,175	1,575	1,250	*1,000	*3,000	3,525	*2,400	7,100	*3,000			
27	1,200	1,500	1,200	*950	*4,000	2,900	*2,400	6,950	*3,000	*3,500	*1,950	
28	1,200	1,550	1,175	900	4,650	3,000	2,850	6,900	*3,000			
29	1,250	...	1,150	920	2,225	2,950	2,800	6,675	*3,000			
30	1,225	...	1,125	920	2,025	3,650	2,775	7,200	*3,000	V		
31	1,200	...	1,075	...	1,800	...	2,975	7,000	...	V	...	V

Month	Mean Daily Gage Height—Feet			Mean Daily Second Feet				Average Second. Feet	Acre Feet		
				High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates						
January.....	....	....	29	1,250				1,050	1,120	68,600	
February.....	....	26	1,580		1	1,220		1,390	77,100		
March.....	....	2	1,680		31	1,080		1,370	84,200		
April.....	....	22	*4,000		18	870		1,160	68,900		
May.....	....	23	4,650		23	895		1,480	90,900		
June.....	....	30	3,650		24	1,380		1,960	117,000		
July.....	....	10	7,750				*2,400	3,900	240,000		
August.....	....	11	14,000		2	2,820		8,510	524,000		
September.....	....	7	18,200				*3,000	8,500	506,000		
October.....	....			*6,000			*3,000	*4,680	*288,000		
November.....	....			*2,600			*1,950	*2,080	*124,000		
December.....	....			*1,850			*1,850	*1,850	*114,000		
Yearly.....	....	....		18,200			870	3,180	2,302,700	38.1	

\* Partly Estimated

## RIO GRANDE AT LOWER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 6 miles below the towns of Presidio, Texas and Ojinaga, Chihuahua, and  $7\frac{1}{2}$  miles below the confluence of the Rio Conchos with the Rio Grande.

**Records:** Based on frequent meter measurements. Computations by shifting channel methods. 1926 records fair.

**Remarks:** The river flow is greatly modified by irrigation diversions and Elephant Butte reservoir in the United States and by Boquilla reservoir, on the Rio Conchos, as well as by irrigation diversions in Mexico. The river section at this station is very changeable due to combined effects of sediment and variation in flow of the Rio Grande and the Rio Conchos, and is subject to backwater from storm flows in the Alamito Creek which enters the river about  $\frac{1}{2}$  mile below this station. This station was operated by the Chihuahua Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated, the drainage area above this station is 60,434 square miles, of which 35,575 are in the United States and 24,859 in Mexico.

Mean Daily Discharge in Second Feet and Annual Summary, ~~1926~~ 1926

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,745	1,600	^	^	^	^	^	^	^	^	^	^
2	1,850	1,825				*3,200	*1,500	*5,000	*4,500			
3	1,975	1,775				V		V				
4	2,050	1,725										
5	2,025	1,700										
6	1,900	1,575	*1,500	*1,350	*2,000	^	V		V	*3,500	*2,400	
7	1,925	1,775										
8	1,900	1,800										
9	1,925	1,800										
10	2,025	1,775										
11	2,025	1,825				*1,800	*2,000	*2,900	*8,000			
12	2,025	1,850				V						
13	2,050	1,775				A						
14	1,975	1,800										
15	1,925	1,850										
16	2,025	1,825				V		V		V	*5,500	
17	2,025	1,850				A		A		A		*2,000
18	1,975	1,875					V		V			
19	1,950	1,875	*1,420	*1,550	*1,600	A		A				
20	1,900	1,825										
21	1,875	1,775										
22	1,825	1,800										
23	1,850	1,775										
24	1,875	1,775										
25	1,950	*1,500	*1,350									
26	1,975	*1,500										
27	1,975	*1,500				V		V				
28	1,875	*1,500						A				
29	1,825											
30	1,875											
31	1,850		V			V		V		V		V

Month	Mean Daily Gage Height—Feet		Mean Daily Second Feet				Average Second Feet	Acre Feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	15.19	14.86	4	2,050	1	1,740	1,930	119,000		
February.....	.....	.....	18	1,880	25-28	*1,500	1,740	96,800		
March.....	.....	.....				*1,350	*1,440	*88,500		
April.....	.....	.....				*1,350	*1,490	*88,600		
May.....	.....	.....					*1,750	*108,000		
June.....	.....	.....					*1,910	*114,000		
July.....	.....	.....					*2,530	*158,000		
August.....	.....	.....	27	*14,000			*5,310	*326,000		
September.....	.....	.....					*5,640	*336,000		
October.....	.....	.....					*4,250	*261,000		
November.....	.....	.....					*2,150	*128,000		
December.....	.....	.....					*2,000	*123,000		
Yearly.....	.....	.....		*14,000		*1,350	*2,600	*1,946,900	*32.2	

## RIO GRANDE AT LOWER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 6 miles below the towns of Presidio, Texas, and Ojinaga, Chihuahua, and 7½ miles below the confluence of the Rio Conchos with the Rio Grande.

**Records:** Based on frequent meter measurements. Computations by shifting channel methods. 1927 records fair.

**Remarks:** The river flow is greatly modified by irrigation diversions and Elephant Butte reservoir in the United States and by Boquilla reservoir, on the Rio Conchos, as well as by irrigation diversions in Mexico. The river section at this station is very changeable due to combined effects of sediment and variation in flow of the Rio Grande and the Rio Conchos, and is subject to backwater from storm flows in the Alamito Creek which enters the river about ½ mile below this station. This station was operated by the Chihuahua Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated, the drainage area above this station is 60,434 square miles, of which 35,575 are in the United States and 24,859 in Mexico.

## Mean Daily Discharge in Second Feet and Annual Summary, 1927

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,700		^	1,460	1,290	1,250	1,270	2,230	2,700	2,300	1,390	1,530
2	1,740		^	1,370	1,280	1,300	1,290	2,000	2,600	2,200	1,460	1,640
3	1,760			1,360	1,250	1,220	1,260	2,170	2,530	2,100	1,520	1,680
4	1,680			1,390	1,250	1,340	1,350	3,130	2,340	2,000	1,520	1,980
5	1,670			1,370	1,190	1,310	1,420	2,770	2,200	2,230	1,540	1,700
6	1,610			1,510	1,100	1,280	1,510	2,580	2,110	2,160	1,530	1,670
7	1,580			2,610	1,150	1,360	1,500	2,370	2,020	2,200	1,580	1,760
8	1,580			2,380	1,080	1,250	1,270	2,060	1,680	2,810	1,640	1,980
9	1,590			1,400	1,130	1,260	1,300	1,900	1,620	2,210	1,50	1,800
10	1,600			1,340	1,170	1,320	1,450	1,630	1,620	2,160	1,750	1,690
11	1,600		*1,400†	1,330	1,200	1,300	1,440	1,530	1,410	2,190	1,700	1,710
12	1,650			1,310	1,180	1,260	1,400	1,800	1,340	2,200	1,760	1,740
13	1,610			1,290	1,070	1,280	1,400	2,530	1,340	2,030	1,710	1,880
14	1,500			1,270	1,000	1,300	1,540	2,320	1,350	2,030	1,300	1,970
15	1,560		*1,560†	1,260	1,070	1,300	1,290	1,960	1,340	2,350	1,600	1,920
16	1,570			1,390	1,080	2,230	1,370	*1,870	1,940	2,020	1,650	1,880
17	1,580			1,420	1,300	1,770	1,220	2,600	1,660	2,020	1,570	2,000
18	1,560			1,310	1,240	1,320	1,340	2,000	1,570	1,950	1,530	2,030
19	1,610			1,160	1,190	1,380	1,690	2,000	3,380	1,900	1,630	1,980
20	1,590			1,100	1,100	1,590	1,560	2,000	3,130	1,720	1,670	1,590
21	1,490			1,150	1,140	1,850	1,370	2,000	2,690	1,570	1,630	1,520
22	1,550		√	1,170	1,150	2,030	1,260	2,000	4,730	1,560	1,520	1,550
23	1,580			1,400	1,320	1,88	1,670	1,270	2,000	4,980	1,900	1,700
24	1,580			1,420	1,370	1,210	1,450	1,250	3,000	5,000	1,690	1,620
25	1,590			1,430	1,430	1,220	1,410	1,290	3,000	4,500	1,580	1,980
26	1,590		V	1,370	1,440	1,180	1,430	1,380	3,000	3,500	1,570	2,020
27	1,540			1,340	1,390	1,550	1,470	1,440	3,000	3,100	1,520	2,020
28	1,470			1,390	1,290	1,260	1,660	1,650	3,000	3,100	1,400	1,840
29	1,560			1,400	1,220	1,300	1,360	1,760	2,900	2,700	1,470	1,550
30	1,570			1,400	1,270	1,320	1,220	2,380	2,800	2,500	1,500	1,730
31	1,570			1,430	1,430	1,310	1,810	2,700	...	1,390	...	1,900

Month	Mean Daily Gage Height—Feet			Mean Daily Second Feet				Average Second Feet	Acre Feet		
	High		Dates	High		Low			Total	Per Sq. Mile	
	High	Low		Dates	Low	Dates	Low				
January.....	15.07	14.79	3	1,760	28	1,470	1,500	98,000			
February.....	....	....		††*1,900	....			*1,560	*86,600		
March.....	....	....		††*1,800	....			*1,400	*86,000		
April.....	15.71	14.34	7	2,610	20	1,100	1,400	83,500			
May.....	14.87	14.21	27	1,550	14	1,000	1,200	73,600			
June.....	15.45	14.50	16	2,230	30	1,220	1,440	85,600			
July.....	15.36	14.50	30	2,380	17	1,220	1,440	88,700			
August.....	....	....		††*6,000	....			2,350	144,000		
September.....	....	....		††*8,000	....			2,560	152,000		
October.....	....	....		††*3,000	....			1,930	119,000		
November.....	15.29	14.70	26	2,020	1	1,390	1,660	98,700			
December.....	15.30	14.60	18	2,030	28	1,300	1,730	107,000			
Yearly.....	....	14.21		††*8,000	....			1,000	1,222,700	20.2	

††\* Maximum discharges were not greater than these estimates.

† Feb. no observations made. Mar. no observations made until 23rd.

\* Partly Estimated

## RIO GRANDE AT LOWER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 6 miles below the towns of Presidio, Texas, and Ojinaga, Chihuahua, and  $7\frac{1}{2}$  miles below the confluence of the Rio Conchos with the Rio Grande.

**Records:** Based on frequent meter measurements during the year. Computations by shift-ing channel methods. 1928 records fair.

**Remarks:** The river flow is greatly modified by irrigation diversions and Elephant Butte reservoir in the United States and by Boquilla reservoir, on the Rio Conchos, as well as by irrigation diversions in Mexico. The river section at this station is very changeable due to combined effects of sediment and variation in flow of the Rio Grande and the Rio Conchos, and is subject to backwater from storm flows in the Alamito Creek which enters the river about  $\frac{1}{2}$  mile below this station. This station was operated by the Chihuahua Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated, the drainage area above this station is 60,434 square miles, of which 35,573 are in the United States and 24,859 in Mexico.

## Mean Daily Discharge in Second Feet and Annual Summary, 1928

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,770	1,830	1,610	1,160	1,210	1,230	1,280	2,550	3,500			
2	1,760	1,860	1,530	1,120	1,240	1,240	1,280	2,030	3,370			
3	1,750	1,850	1,560	1,150	1,250	1,340	1,280	1,970	3,790			
4	1,740	1,810	1,550	1,210	1,260	1,340	1,260	2,360	3,230			
5	1,640	1,810	1,500	1,240	1,180	1,220	1,220	4,000	*3,250			
6	1,600	1,850	1,463	1,290	1,330	1,190	1,150	2,390	*2,900			
7	1,670	1,840	1,410	1,260	1,380	1,240	1,130	2,040	*2,700			
8	1,740	1,810	1,330	1,210	1,390	1,320	1,190	2,300	*2,400			
9	1,820	1,640	1,300	1,080	1,640	1,360	1,220	3,540	*2,100			
10	1,660	1,570	1,330	1,110	1,760	1,350	1,230	2,600	*1,900			
11	1,770	1,580	1,310	1,150	1,670	1,370	1,320	2,920	*1,700			
12	1,640	1,630	1,330	1,170	1,570	1,340	1,800	3,080	*1,550			
13	1,670	1,670	1,310	*1,180	1,580	1,260	1,800	3,370	*1,400			
14	1,760	1,670	1,270	*1,400	1,610	1,180	1,680	*3,500	*1,300			
15	1,770	1,670	1,210	*1,500	1,660	1,210	1,720	3,760	*1,300	†1,900	2,130	†1,900
16	1,780	1,670	1,130	*1,500	1,810	1,320	1,740	4,220	*1,270			
17	1,590	1,670	1,160	*1,500	1,640	1,360	1,580	4,790	*1,300			
18	1,570	1,780	1,200	*1,500	1,530	1,380	1,490	*6,300	*1,350			
19	1,450	1,810	1,210	*1,500	1,640	1,350	1,390	*4,500	1,430			
20	1,390	1,840	1,230	*1,500	1,620	1,330	1,300	*4,500	1,430			
21	1,430	1,810	1,240	*1,400	1,530	1,810	1,400	*5,000	1,350			
22	1,480	1,840	1,190	*1,250	1,410	1,240	1,620	*4,500	1,360			
23	1,470	1,670	1,150	*1,080	1,380	1,180	2,130	*4,500	1,430			
24	1,420	1,630	1,180	1,110	1,290	1,210	3,360	4,320	1,370			
25	1,370	1,700	1,240	1,130	1,280	1,200	1,650	5,630	1,390			
26	1,420	1,680	1,280	1,100	1,770	1,160	1,910	14,200	1,520			
27	1,710	1,670	1,190	1,150	1,510	1,200	1,920	8,390	1,480			
28	1,810	1,710	1,270	1,080	1,450	1,210	2,680	5,530	2,000			
29	1,820	1,710	1,240	1,180	1,410	1,150	3,360	4,610	2,320			
30	1,830	....	1,180	1,180	1,360	1,230	3,200	4,200	1,860			
31	1,850	....	1,160	....	1,260	....	2,740	3,920	....	V	V	V

Month	Mean Daily Gage Height—Feet		Mean Daily Second Feet				Average Second Feet	Acre-feet		
			High		Low			Total	Per Sq. Mile	
	High	Low	Dates		Dates					
January.....	15.28	14.78	31	1,850	25	1,370	1,650	101,000		
February.....	15.29	15.00	2	1,860	10	1,570	1,730	99,700		
March.....	15.04	14.46	1	1,610	16	1,130	1,300	79,900		
April.....	....	....	15-20	*1,500	9-28	1,080	*1,250	*74,200		
May.....	15.24	14.54	16	1,810	5	1,180	1,470	90,400		
June.....	14.79	14.50	18	1,380	29	1,150	1,270	75,600		
July.....	16.11	14.37	24	3,360	7	1,180	1,740	107,000		
August.....	19.55	15.19	26	14,200	3	1,970	*4,240	*261,000		
September.....	16.50	....	3	3,790	16	1,270	1,980	*118,000		
October.....	....	....	....	....	....	....	†1,900	†117,000		
November.....	....	....	....	....	....	....	2,130	127,000		
December.....	....	....	....	....	....	....	†1,900	†117,000		
Yearly.....	....	....	....	14,200	....	....	1,890	1,367,800	22.6	

\*\*Maximum discharges were not greater than these estimates.

\* Partly Estimated

## RIO GRANDE AT LANGTRY STATION

**Description:** Staff gage 900 feet downstream from present water-stage recorder also cable 500 feet downstream from staff gage.

**Records:** Based upon frequent meter measurements and two staff gage readings daily. 1924 records as here shown are poor.

**Remarks:** For more complete data concerning this station see 1934 record elsewhere herein, also former Water Bulletins.

## Mean Daily Discharge in Second Feet and Annual Summary, 1924

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*5,500	*1,900	1,910	↑	↑	*2,800	↑	1,910	1,380	2,700	1,640	
2	*7,000		1,910			*5,000		1,910	1,910	2,520	1,640	
3	*7,000		1,910	*1,700	*1,400	3,480	*1,280	1,770	*3,000	2,520	1,640	
4	*6,900		2,060			3,700		1,770	*2,800	2,520	1,640	
5	*6,700		1,910	↓		2,880		1,640	2,520	2,886	1,500	
6	*6,500	*1,800	1,910	1,380		1,910	↓	3,070	2,200	3,270	1,500	*1,500
7	*6,350		1,910	*1,380		1,770		2,520	2,520	7,380	1,500	
8	*6,200		1,910	*1,500		1,040	1,280	1,640	2,880	11,600	1,500	
9	*5,500		1,910	*1,500		1,500	1,380	1,500	2,520	7,700	1,500	
10	*5,000		1,910	*1,500	2,200	1,440	1,380	1,380	2,520	3,270	1,500	
11	*4,700		1,910	*1,500	1,910	1,380	1,280	1,180	2,520	2,880	1,500	
12	*4,400		1,770	*1,490	*1,700	*1,370	1,380	1,130	2,200	2,520	1,500	
13	*4,150		1,770	*1,470	*1,700	*1,350	1,440	1,080	2,200	2,200	1,500	
14	*3,900		1,460	*1,700	*1,330	*1,560	1,040	2,520	2,060	1,500		
15	*3,700	↑		*1,450	2,060	*1,320	*1,700	995	2,200	2,200	1,500	↑
16	*3,450	↓		*1,450	2,060	*1,300	*1,850	995	2,200	2,060	1,500	
17	*3,250	*2,000		*1,440	1,910	*1,280	*2,000	995	2,200	2,060	1,500	
18	*3,100	2,200		*1,430	1,910	*1,270	*2,600	955	2,200	2,060	1,500	
19	*2,900	3,270		*1,420	2,060	*1,250	*3,500	955	2,200	1,910	1,500	
20	2,700	3,700	↑	*1,410	1,910	*1,240	*3,050	955	2,880	1,910	1,500	
21	2,520	2,880	*1,700			1,700	*1,230	2,700	955	4,160	1,910	1,500
22	2,360	2,200				1,640	*1,210	2,520	955	5,140	1,770	1,500
23	2,200	2,060				1,570	*1,200	2,520	955	5,660	1,640	1,500
24	2,700	2,060				1,380	1,180	3,270	915	5,140	1,640	1,500
25	2,360	1,910				1,280	1,180	2,700	878	4,160	1,640	1,500
26	*2,200	2,060		*1,400		1,380	1,180	2,520	840	3,270	1,640	1,500
27	*2,100	1,910				1,500	1,180	2,520	840	3,070	1,640	1,500
28	*2,100	1,910				1,500	1,220	2,520	1,220	2,880	1,640	*1,500
29	*2,100	2,060				1,500	1,280	2,200	1,080	2,880	1,640	*1,500
30	*2,100	...	V	V		1,380	1,280	2,200	995	2,700	1,640	*1,500
31	*2,100	...	V	V		1,380	...	2,200	995	...	1,640	...

Month	Mean Daily Gage Height—Feet	Mean Daily Second Feet						Average Second Feet	Acre Feet			
		High			Low				Total	Per Sq. Mile		
		High	Low	Dates		Dates						
January.....	....	....			*7,000			*2,100	*3,990	*245,000		
February.....	....	....		20	3,700			*1,800	*2,040	*117,000		
March.....	....	....		4	2,060			*1,700	*1,780	*110,000		
April.....	....	....			*1,700			*1,400	*1,480	*87,800		
May.....	....	....		10	2,200		25	1,280	1,610	99,000		
June.....	....	....		2	*5,000			1,180	1,710	102,000		
July.....	....	....		19	*3,500			1,280	1,980	121,000		
August.....	....	....		6	3,070		26-27	840	1,290	79,400		
September.....	....	....		23	5,660			1,380	2,890	172,000		
October.....	....	....		8	11,600			1,640	2,800	172,000		
November.....	....	....			1,640			*1,500	1,520	90,400		
December.....	....	....			*1,500			*1,500	*1,500	*92,200		
Yearly.....	....	....			11,600			840	2,050	1,487,800	19.2	

\* Partly Estimated

## RIO GRANDE AT LANGTRY STATION

**Description:** Staff gage 900 feet downstream from present water-stage recorder, also cable 500 feet downstream from staff gage.

**Records:** Based upon frequent meter measurements and two staff gage readings daily. 1925 records as here shown are fair.

**Remarks:** For more complete details concerning this station see 1934 record elsewhere herein, also former Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1925

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		1,500	1,500	1,380	1,080	2,840	3,210	5,000	8,120	3,410	3,620	2,040
2		1,500	1,500	1,380	1,040	2,340	3,020	2,840	8,120	3,210	3,410	2,040
3		1,500	1,500	1,380	1,040	2,340	4,520	2,670	8,600	3,020	3,410	2,040
4		1,500	1,280	1,040		5,720	2,670	11,100	2,840	3,020	2,040	
5			1,220	1,040		4,760	2,500	16,600	2,670	3,020	2,040	
6			1,220	995		4,520	2,670	22,800	2,340	2,670	2,040	
7			1,180	995		4,520	8,840	26,800	2,670	2,670	2,040	
8		1,380	1,640	1,180	995	*2,200	4,520	14,700	30,000	2,500	2,670	2,040
9			1,180	1,080		4,520	15,500	29,000	3,020	2,500	1,890	
10			1,180	1,220		4,280	20,100	26,000	3,020	2,340	1,890	
11			V	1,180	1,500	5,960	22,000	22,000	7,420	2,340	1,890	
12		1,500	1,180	1,910		V	6,680	23,000	22,000	9,840	2,190	1,890
13		1,500	1,640	1,380	*2,070	7,400	23,000	18,500	6,680	2,190	1,890	
14		1,500	1,500	1,280	*1,940	6,680	21,000	14,000	10,400	2,190	1,890	
15			1,280	1,220	*1,820	5,960	21,000	12,500	16,000	2,190	1,890	
16	1,500		V	1,180	1,220	V	4,760	18,000	11,000	6,680	2,190	1,890
17			A	1,180	1,180	4,760	16,500	9,500	5,480	2,190	2,040	
18			V	1,180	1,700	*1,700	5,720	16,000	8,000	5,240	2,190	2,040
19			V	1,080	1,570		4,760	15,500	7,000	5,240	2,190	2,040
20			V	1,080	1,080		4,280	11,500	6,500	5,480	2,190	2,040
21			V	1,040	1,080		4,280	11,000	6,000	7,160	2,190	2,040
22			V	995	1,080		4,050	10,500	5,500	7,160	2,190	2,040
23		1,500	V	1,380	995	1,080	V	3,620	10,100	5,240	7,400	2,190
24			V	995	1,080	*1,750	3,020	9,500	7,640	6,920	2,190	2,040
25			V	1,220	1,080	*1,550	2,840	9,090	7,640	6,200	2,040	2,040
26			V	10,400	1,080	*1,500	2,670	9,590	5,240	5,960	2,040	2,040
27			V	5,660	5,400	*1,550	2,500	9,090	4,760	5,480	2,040	2,040
28			V	1,910	27,100	*1,600	2,340	9,090	4,280	5,240	2,040	2,040
29			V	1,770	29,200	2,670	2,340	8,840	3,830	4,520	2,040	2,040
30			V	1,180	16,000	3,410	2,190	8,360	3,620	3,830	2,040	2,040
31			V		8,840	....	2,340	7,880	....	3,830	....	2,040

Month	Mean Daily Gage Height—Feet	Mean Daily Second Feet				Average Second Feet	Acre Feet		
		High		Low			Total	Per Sq. Mile	
		High	Low	Dates	Dates				
January.....	....	....		1,500		1,500	1,500	92,200	
February.....	....	....		1,500		1,380	1,440	80,000	
March.....	....	....		1,640		1,380	1,470	90,100	
April.....	....	....	26	10,400		995	1,710	102,000	
May.....	....	....	29	29,200		995	3,790	233,000	
June.....	....	....	30	3,410		*1,500	*2,030	*121,000	
July.....	....	....	13	7,400	30	2,190	4,280	263,000	
August.....	....	....	12-13	23,000	5	2,500	*11,900	*730,000	
September.....	....	....	8	30,000	30	3,620	*12,400	*738,000	
October.....	....	....	15	16,000	6	2,340	5,510	339,000	
November.....	....	....	1	3,620		2,040	2,410	144,000	
December.....	....	....		2,040		1,890	2,000	123,000	
Yearly.....	....	....		34,800		995	4,220	3,055,300	
								39.4	

\*Partly Estimated

## RIO GRANDE AT LANGTRY STATION

**Description:** Staff gage 900 feet downstream from present water-stage recorder also cable 500 feet downstream from staff gage.

**Records:** Based upon frequent meter measurements and two staff gage readings daily. 1926 records as here shown are fair.

**Remarks:** For more complete data concerning this station see 1934 record elsewhere herein, also former Water Bulletins.

## Mean Daily Discharge in Second Feet and Annual Summary, 1926

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,040	2,040	1,760	1,510	1,630	4,260	1,510	*8,000	*8,200	3,830	2,840	2,040
2	2,040	2,040	1,760	1,510	2,670	1,510	1,450	*6,500	*7,000	4,760	2,840	2,040
3	2,040	2,040	1,760	1,510	2,340	1,570	1,390	*6,500	*6,400	6,680	3,210	2,040
4	2,040	2,040	1,760	1,510	2,040	1,760	1,340	6,200	*5,900	5,720	2,840	2,040
5	2,040	2,040	1,760	1,510	2,040	3,410	1,340	5,480	5,720	5,480	2,840	2,040
6	2,040	1,890	1,760	1,760	3,020	3,300	1,340	5,240	5,000	5,240	2,670	2,040
7	2,190	2,040	1,760	2,190	2,040	4,520	1,340	4,760	4,280	4,520	2,670	2,340
8	2,190	2,040	1,760	1,630	1,890	3,210	1,450	4,050	3,830	3,830	2,670	2,500
9	2,190	1,890	1,760	1,760	2,190	2,670	2,190	3,830	5,480	3,620	2,670	2,340
10	2,190	1,890	1,760	1,760	2,340	2,190	2,340	3,410	5,000	3,410	2,670	2,340
11	2,190	1,890	1,760	1,510	2,190	1,890	2,190	3,210	5,000	3,210	2,670	2,190
12	2,190	1,890	1,760	1,510	2,040	1,890	1,890	3,020	9,740	3,020	2,670	2,190
13	2,190	1,890	1,630	1,510	2,190	1,760	1,760	2,670	*12,500	2,840	2,500	2,190
14	2,190	1,890	1,630	1,510	2,040	1,630	2,040	4,320	*13,000	2,670	2,500	2,190
15	2,190	1,890	1,630	1,450	1,890	1,510	2,040	3,410	*13,000	16,700	2,500	2,190
16	2,190	1,890	1,510	1,450	1,760	1,450	2,500	2,500	*11,500	9,620	2,340	2,190
17	2,190	1,890	1,570	1,510	1,760	1,390	2,340	2,840	*9,500	6,200	2,340	2,190
18	2,190	1,890	1,630	1,510	1,760	1,390	2,340	2,670	*8,000	4,760	2,340	2,190
19	2,190	1,890	1,630	1,450	1,760	5,490	2,340	3,020	*7,000	3,830	2,340	2,190
20	2,190	1,890	1,630	1,510	1,760	2,800	2,190	3,020	*6,500	7,480	2,340	2,190
21	2,190	1,890	1,630	1,630	1,760	1,760	2,340	3,820	*5,900	8,360	2,190	2,190
22	2,190	1,890	1,630	1,630	1,760	1,630	4,010	4,280	*5,700	8,600	2,190	2,190
23	2,190	1,890	1,570	1,630	1,760	1,630	4,440	4,050	*5,500	7,640	2,190	2,190
24	2,190	1,760	1,510	2,040	2,040	1,570	2,670	5,720	*5,200	7,160	2,190	2,190
25	2,040	1,760	1,510	2,040	2,190	1,570	2,670	19,000	*4,900	6,440	2,040	2,190
26	2,040	1,760	1,510	1,760	2,340	1,570	2,670	18,800	*4,700	5,480	2,190	2,190
27	2,040	1,760	1,510	1,630	2,040	1,510	2,670	12,100	*4,500	5,000	2,190	2,190
28	2,040	1,760	1,510	1,630	2,840	1,760	2,670	*16,000	4,280	4,760	2,190	2,190
29	2,040	...	1,510	1,630	2,340	1,760	2,670	*15,000	4,050	3,830	2,040	2,190
30	2,040	...	1,510	1,630	1,760	1,510	3,960	*12,500	3,830	3,210	2,040	2,190
31	2,040	...	1,510	...	1,760	...	*	9,000	*9,500	3,020	...	2,190

Month	Mean Daily Gage Height--Feet	Mean Daily Second Feet						Average Second Feet	Acre Feet		
		High			Low				Total	Per Sq. Mile	
		High	Low	Dates	Dates						
January.....	....	....	....		2,190			2,040	2,130	131,000	
February.....	....	....	....		2,040			1,760	1,900	106,000	
March.....	....	....	....		1,760			1,510	1,640	101,000	
April.....	....	....	7	2,190	15-16		1,450	1,630	96,800		
May.....	....	....	6	3,020	1	1,630		2,060		127,000	
June.....	....	....	19	5,490		1,390		2,200		131,000	
July.....	....	....	31	*9,000	4-7	1,340		2,490		153,000	
August.....	....	....	25	19,000	16	2,500		*6,630		*407,000	
September.....	....	....	14-15	*13,000	8	3,830		*6,700		*399,000	
October.....	....	....	15	16,700	14	2,670		5,510		339,000	
November.....	....	....	3	3,210				2,460		147,000	
December.....	....	....	8	2,500				2,040		134,000	
Yearly.....	....	....		19,000				1,340	3,140	2,271,800	
										29.3	

\* Partly Estimated

## RIO GRANDE AT LANGTRY STATION

**Description:** Staff gage 900 feet downstream from present water-stage recorder also cable 500 feet downstream from staff gage.

**Records:** Based upon frequent meter measurements and two staff gage readings daily. 1927 records as here shown are fair.

**Remarks:** For more complete data concerning this station see 1934 record elsewhere herein, also former Water Bulletins.

## Mean Daily Discharge in Second Feet and Annual Summary, 1927

Day	Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,190	2,040	2,040	1,890	1,510	1,450	1,510	2,500	3,210	3,410	2,040	2,040
2	2,040	2,040	2,040	1,760	1,510	1,390	*4,700	2,190	3,020	3,410	1,890	2,040
3	2,040	2,040	2,040	1,890	1,510	1,390	*2,600	2,040	*3,000	3,210	1,890	2,040
4	2,040	2,040	2,040	2,460	1,510	1,390	*2,000	1,760	*3,000	2,670	1,890	2,040
5	2,040	2,040	2,040	2,250	1,510	*1,700	2,040	*3,000	2,500	1,890	2,040	2,040
6	2,040	2,040	2,040	1,890	1,510	1,510	1,510	2,040	*3,000	2,500	1,760	2,040
7	2,040	2,040	2,040	1,890	1,510	1,510	1,510	2,040	2,840	2,340	1,760	2,040
8	2,040	2,040	1,890	1,890	1,510	1,450	1,510	*2,040	2,670	2,190	1,760	1,890
9	2,040	2,500	1,890	1,890	1,510	1,450	1,450	*2,040	*2,500	2,500	1,760	1,890
10	2,040	2,040	1,890	2,190	1,390	1,450	1,450	*2,040	*2,300	2,190	1,760	1,890
11	2,040	2,190	1,890	2,040	1,390	1,390	1,450	2,040	*2,200	2,840	1,760	1,760
12	2,040	2,040	1,890	1,890	1,390	1,390	1,450	2,040	*2,000	2,670	1,630	1,760
13	2,190	2,040	1,890	2,040	*2,500	2,040	1,450	2,190	1,890	2,340	1,630	1,760
14	2,190	2,040	1,890	1,890	*1,800	4,110	3,210	2,190	2,040	2,340	1,630	1,890
15	2,190	2,040	1,890	1,890	1,630	1,450	3,410	2,040	2,040	2,340	1,760	2,040
16	2,190	2,040	1,890	1,760	1,390	1,340	2,840	2,040	2,500	2,340	1,890	2,040
17	2,190	2,040	1,890	1,630	1,390	2,190	2,500	*2,300	2,040	2,190	2,040	2,190
18	2,190	2,040	1,890	1,630	1,390	2,670	2,040	*2,300	1,760	2,190	1,890	2,190
19	2,190	2,040	1,890	1,630	1,510	2,340	1,510	*2,300	2,670	2,190	1,890	2,340
20	2,190	2,040	1,890	1,630	1,510	1,890	1,510	2,340	2,340	2,190	1,890	2,340
21	2,190	2,040	1,890	1,510	1,510	3,030	1,450	2,500	3,210	2,190	1,760	2,340
22	2,190	2,040	1,890	1,510	1,510	*4,200	1,450	2,340	3,210	2,190	1,760	2,340
23	2,190	2,040	1,890	1,510	1,510	*2,800	1,630	2,670	3,020	2,040	1,760	2,190
24	2,190	2,040	1,890	1,510	1,510	1,890	1,510	2,340	3,410	2,040	1,760	2,190
25	2,190	2,040	1,890	1,510	1,510	1,760	1,510	2,500	4,520	1,890	1,760	2,190
26	2,190	2,040	1,890	1,510	1,510	1,630	1,890	2,500	5,960	2,040	1,890	2,190
27	2,040	2,040	1,890	1,510	1,510	2,190	1,510	2,500	8,840	2,040	2,040	2,190
28	2,040	2,040	1,890	1,510	1,510	2,190	1,450	5,480	6,200	1,890	2,040	2,190
29	2,040	...	1,890	1,510	1,510	1,630	2,500	4,760	5,720	1,890	2,040	2,190
30	2,040	...	1,890	1,510	1,510	1,450	2,040	4,280	4,280	2,040	1,890	2,190
31	2,040	...	1,890	...	1,450	...	2,670	3,410	...	2,040	...	2,190

Month	Mean Daily Gage Height--Feet	Mean Daily Second Feet				Average Second Feet	Acre Feet		
		High		Low			Total	Per Sq. Mile	
		High	Low	Dates	Dates				
January.....	....	....	....		2,190		2,040	2,110	
February.....	....	....	....		2,500		2,040	2,060	
March.....	....	....	....		2,040		1,890	1,920	
April.....	....	....	....		2,460		1,510	1,770	
May.....	....	....	....		*2,500		1,390	1,530	
June.....	....	....	....		*4,200		1,340	1,970	
July.....	....	....	....		*4,700		1,450	1,970	
August.....	....	....	....		5,480		1,760	2,510	
September.....	....	....	....		8,840		1,760	3,280	
October.....	....	....	....		3,410		1,890	2,350	
November.....	....	....	....		2,040		1,630	1,840	
December.....	....	....	....		2,340		1,760	2,090	
Yearly.....	....	....	....		8,840		1,340	2,110	
							1,530,100	19.7	

\* Partly Estimated

## RIO GRANDE AT EAGLE PASS STATION

**Description:** Staff gage at International Highway bridge.

**Records:** Based upon frequent meter measurements from bridge. 1924 records are poor.

**Remarks:** For fuller station details see 1934 records elsewhere herein and previous Water Bulletins.

## Mean Daily Discharge in Second Feet and Annual Summary, 1924

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*5,000	^	^	2,800	3,010	*7,500	3,230	3,230	2,220	^	^	^
2	*5,000	^	^	2,800	2,800	6,350	3,230	3,230	2,220			
3	8,880	*4,000	*3,380	2,800	2,800	4,960	2,800	3,230	2,220			
4	8,880			*2,800	2,800	6,060	2,800	3,230	3,010			
5	8,880	V		*2,800	2,800	5,500	2,040	2,800	4,700			
6	8,880	3,460		*2,800	8,210	4,190	2,040	3,230	4,190			
7	8,880	3,460		2,800	5,230	4,190	2,040	3,230	3,940			
8	8,210	3,460		2,800	3,700	4,190	2,040	3,940	3,700			
9	8,210	3,230	V	2,800	3,700	3,700	2,040	3,230	3,940			
10	8,210	3,230		*3,220	3,230	3,700	2,040	2,800	4,190			
11	7,560	3,230		*3,200	2,800	3,700	2,040	2,600	4,190	*5,400	*3,180	*2,900
12	6,940	3,010		2,800	2,800	2,600	2,040	2,410	4,190			
13	6,640	3,010		2,800	3,230	2,600	2,800	*2,350	4,190			
14	^	2,800		2,800	3,230	2,600	2,410	*2,300	20,800			
15		2,800		2,800	3,230	2,600	2,410	*2,250	16,900			
16		3,010		2,800	2,800	2,600	*2,400	*2,200	10,200			
17		3,460		2,800	2,800	3,700	*2,600	*2,150	7,250			
18	5,160	3,700	*3,100	2,800	2,800	2,600	2,800	*2,100	6,350			
19		3,700		2,800	3,010	2,040	3,230	*2,050	3,940			
20		3,700		2,800	2,230	2,040	4,700	*2,010	6,350			
21		3,940		2,800	5,230	2,040	4,700	*1,970	6,940			
22		3,700		2,800	3,700	2,040	3,700	*1,920	8,880			
23	V	3,230		2,800	3,700	2,040	3,700	1,880	14,200			
24	^	3,010		3,230	3,700	2,040	3,460	1,880	8,880			
25		3,460		3,230	3,230	2,040	*3,700	1,880	7,560			
26		3,940		2,800	3,010	2,040	3,940	1,880	6,640			
27	*4,000	3,700		2,800	2,800	2,040	3,460	1,880	6,640			
28		3,230		2,800	2,800	2,040	3,230	1,880	6,350			
29		3,230		2,800	*6,000	2,040	*3,200	1,880	5,780			
30	V	....	V	2,800	*6,000	2,040	*3,200	1,880	5,500		V	V
31		....	V	....	*6,000	....	*3,200	2,040	....			V

Month	Mean Daily Gage Height—Feet	Mean Daily Second Feet				Average Second Feet	Acre Feet		
		High		Low			Total	Per Sq. Mile	
		High	Low	Dates	Dates				
January.....	....	....	....	8,880	....	*4,000	5,930	365,000	
February.....	....	....	....	*4,000	....	2,800	3,470	200,000	
March.....	....	....	....	*3,380	....	*3,100	*3,180	*196,000	
April.....	....	....	....	3,230	....	2,800	2,860	170,000	
May.....	....	....	6	8,210	....	2,800	3,690	227,000	
June.....	....	....	1	*7,500	....	2,040	3,260	194,000	
July.....	....	....	8	4,700	....	2,040	2,940	181,000	
August.....	....	....	14	3,940	....	1,880	2,440	150,000	
September.....	....	....	20,800	....	....	2,220	6,540	389,000	
October.....	....	....	*5,400	....	....	*5,400	*5,400	*332,000	
November.....	....	....	*6,000	....	....	*3,180	*3,180	*189,000	
December.....	....	....	*2,900	....	....	*2,900	*2,900	*178,000	
Yearly.....	....	....	....	20,800	....	1,880	3,820	2,771,000	
								21.8	

\* Partly Estimated

## RIO GRANDE AT EAGLE PASS STATION

Description: Staff gage at International highway bridge.

Records: Based upon frequent meter measurements from bridge. 1925 records as here shown are fair.

Remarks: For fuller station details see 1934 record elsewhere herein and previous Water Bulletins.

## Mean Daily Discharge in Second Feet and Annual Summary, 1925

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*2,700	*2,600	*2,500	*2,600	*2,500	*38,000	*5,200	*15,500	*11,000			
2	2,700	*2,600	*2,500	*2,600	*2,400	*19,000		*9,500	*11,000			
3	*2,700	*2,600	*2,500	*2,600	*2,300	*10,000			*6,000	*11,000		
4	*2,700	*2,500	*2,500	*2,500	*2,300				*5,000	*11,000	*7,000	*5,200
5									*5,000	*13,500		
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16	*2,800	*2,400	*2,800	*2,250								
17												
18												
19												
20												
21												
22												
23												
24												
25	V	A	*2,700	V	V							
26												
27												
28	*2,700											
29												
30												
31	V											

Month	Mean Daily Gage Height—Feet			Mean Daily Second Feet			Average Second Feet	Acre Feet		
	High		Low	High		Low		Total	Per Sq. Mile	
	High	Low		Dates						
January.....	.....	.....			*2,800		*2,700	*2,770	*170,000	
February.....					*2,600		*2,400	*2,440	*135,000	
March.....					*2,800		*2,500	*2,710	*167,000	
April.....			28		*11,400		*2,250	*3,020	*150,000	
May.....			30		*140,000	26	*2,220	*14,100	*869,000	
June.....			1		*38,000	29	*3,100	*6,160	*367,000	
July.....			31		*25,000	30	*3,600	*7,730	*475,000	
August.....					*27,000		*5,000	*15,800	*969,000	
September.....			10		*38,000		*7,000	*15,300	*909,000	
October.....					*9,000	31	*5,500	*8,030	*494,000	
November.....					*5,200	30	*3,400	*4,190	*249,000	
December.....					*3,400		*3,400	*3,400	*209,000	
Yearly.....	.....	.....			*140,000		*2,220	*7,170	*5,193,000	
									*40.9	

\* Partly Estimated

INTERNATIONAL BOUNDARY COMMISSION

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## RIO GRANDE AT EAGLE PASS STATION

**Description:** Staff gage at International highway bridge.

**Records:** Based upon frequent meter measurements from bridge. 1926 records as here shown are fair.

**Remarks:** For fuller station details see 1934 record elsewhere herein and previous Water Bulletins.

*Mean Daily Discharge in Second Feet and Annual Summary, 1926*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	3,460	3,320	2,860	2,450	5,580	3,830	3,030	4,180	12,400	*5,600	*5,900	*3,650	
2	3,460	3,250	2,860	2,450	4,110	3,240	2,450	*10,500	9,900	*7,000	*5,600	*3,700	
3	3,460	A	2,860	2,450	3,930	3,460	2,290	*8,300	7,510	*7,100	*5,400	*3,700	
4	3,460		2,670	2,450	3,930	3,240	2,630	6,530	6,850	*6,700	*5,300	*3,700	
5	3,460		A	2,450	3,980	4,080	2,290	7,180	6,850	*6,200	*4,900	*3,700	
6	3,460			2,450	3,930	7,840	2,290	7,840	6,210	*6,400	*4,600	*4,600	
7	3,460	3,140	2,760	2,450	3,930	7,510	2,290	6,210	6,850	*6,400	*4,400	*4,800	
8	3,460			2,450	3,930	6,530	2,290	4,990	6,530	*6,300	*4,200	*4,500	
9	3,460			2,290	3,690	6,210	2,290	4,710	6,530	*5,600	*4,200	*4,300	
10	3,240		V	2,290	3,930	5,890	2,450	3,930	5,890	*4,800	*4,100	*4,150	
11	3,240		V	2,850	2,290	4,180	5,890	2,450	4,180	6,530	*4,700	*4,100	*4,000
12	3,240	3,040	2,820	2,450	4,180	4,710	3,030	3,930	6,530	*4,800	*4,100	*3,800	
13	3,240	A	2,820	2,450	4,710	4,440	3,240	3,930	9,260	*5,400	*4,100	*3,700	
14	3,240		2,820	2,450	3,930	4,710	2,820	3,690	12,000	*10,000	*4,100	*3,500	
15	3,240			2,820	2,450	3,930	4,710	3,030	3,690	12,800	*24,000	*4,000	*3,500
16	3,240			2,820	2,450	4,990	4,440	2,820	4,990	13,200	*22,000	*4,000	*3,600
17	3,240			2,630	2,450	5,580	4,180	2,820	5,020	11,700	*13,500	*4,000	*3,600
18	3,240			2,630	2,450	4,440	4,180	2,820	5,500	9,900	*8,200	*3,900	*3,600
19	3,240			2,630	2,450	4,180	5,230	3,460	4,440	9,200	*6,900	*3,800	*3,650
20	3,240			2,630	2,820	3,240	5,890	3,030	4,440	8,520	*6,600	*3,800	*3,700
21	3,240	2,860	2,630	12,100	3,240	5,890	2,820	3,690	*8,000	*6,200	*3,800	*3,750	
22	3,240		2,820	7,220	3,240	4,440	3,030	4,180	*7,400	*9,000	*3,700	*3,600	
23	3,240			2,820	4,710	3,030	9,010	4,180	4,990	*7,000	*10,000	*3,700	*3,500
24	3,460		3,030	7,180	2,820	3,930	5,890	4,990	*6,600	*11,000	*3,600	*3,800	
25	3,460			3,690	6,850	3,030	2,820	5,280	6,860	*6,400	*8,500	*3,650	*3,700
26	3,380		V	4,180	4,990	3,030	2,820	4,990	17,000	*6,000	*7,500	*3,700	*3,800
27	3,320		V	3,240	3,930	3,030	2,820	3,690	18,000	*6,000	*7,000	*3,650	*3,700
28	3,320		2,820	3,690	3,240	3,030	*4,450	8,530	*6,000	*7,000	*3,600	*3,800	
29	3,320	...	2,630	4,440	3,930	3,030	*5,500	15,800	*6,000	*6,600	*3,600	*3,800	
30	3,320	...	2,630	6,210	3,030	2,820	*5,000	16,900	*6,200	*6,600	*3,600	*3,800	
31	3,320	...	2,630	...	3,240	...	4,180	14,400	....	*6,000	....	*3,700	

## RIO GRANDE AT LAREDO STATION

**Description:** Prior to July a staff gage, after July an automatic water-stage recorder one and one-half miles above present location and cable fifty feet below recorder. Zero of gage at recorder was 351.35 feet, U. S. C. and G. S. mean sea level datum.

**Records:** Based upon frequent meter measurements. 1924 records are poor.

**Remarks:** For fuller station details see 1934 records elsewhere herein and former Water Bulletins.

## Mean Daily Discharge in Second Feet and Annual Summary, 1924

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,760	3,700	2,840		2,580	4,750	2,000		1,820	5,750	3,430	2,820
2	3,700	3,620	2,800		2,460	7,050	*2,350		1,820	5,180	3,420	2,880
3	3,700	3,600	2,880		2,460	*8,000	*2,750		1,880	5,150	3,410	4,300
4	*8,000	3,580	2,880		2,460	*8,000	*3,200		1,880	5,250	3,400	3,850
5	*8,000	3,300	2,880		2,480	*8,000	*3,200		1,920	5,250	3,330	2,950
6	*8,000	3,120	3,120	*2,700	2,560	7,020	*2,400	*2,900	2,680	5,000	3,340	2,800
7	*8,000	2,950	3,120		3,700	5,180	1,800		3,720	5,050	3,300	2,750
8	*7,850	2,880	3,120		5,700	4,550	1,800		3,020	5,400	3,280	2,700
9	*7,800	2,820	3,120		3,850	4,750	1,880	*3,000	3,100	8,600	3,260	2,820
10	*7,600	2,800	3,000		3,050	3,300	1,880	*3,400	3,180	8,900	3,200	2,800
11	*7,500		3,000		2,980	3,200	1,900	*3,000	3,320	*11,500	3,140	2,780
12	*7,400		2,880		3,200	2,900	3,100	1,980	*2,600	3,350	6,400	3,060
13	*6,800		2,900		3,300	2,900	3,060	1,850	2,320	3,280	6,200	3,000
14	6,280	*2,800	2,900		2,530	2,700	3,060	1,800	2,210	3,320	5,550	3,020
15	5,720		2,900		2,390	2,650	2,900	*2,200	2,080	14,000	5,380	2,680
16	5,600		2,900		2,380	2,950	2,850	*2,200	2,060	18,250	5,250	2,950
17	5,600		2,880		2,310	2,950	2,640	*2,200	2,030	11,200	5,120	2,650
18	5,400	2,800	2,880		2,310	3,050	2,500	*2,200	2,000	7,550	5,020	2,900
19	5,200		2,850		2,280	3,280	*3,300	*2,450	1,980	6,050	4,920	2,880
20	5,180		2,910		2,280	2,920	2,380	*2,750	1,820	5,600	4,800	2,650
21	5,100		2,910		2,280	3,750	2,380	*3,100	1,820	4,980	4,800	2,820
22	5,050		2,910		2,230	4,720	2,380	*4,500	1,880	36,500	4,350	2,780
23	4,880	*3,500	2,850		2,240	3,620	2,380	*5,000	1,880	13,200	4,350	2,750
24	4,670		2,670		2,240	3,520	2,180	*4,400	1,870	12,700	4,180	2,720
25	4,600		2,670		2,180	3,200	2,180	*3,800	1,860	8,820	4,180	2,520
26	4,580		2,670		4,000	2,920	2,160	*3,300	1,850	7,800	4,020	2,680
27	4,430		*2,700		3,100	2,840	2,150	*3,500	1,780	7,350	4,020	2,680
28	4,350		*2,700		2,800	2,840	2,040	*3,700	1,720	6,520	3,870	2,700
29	4,160		*2,700		2,450	4,780	2,040	*3,300	1,600	6,180	3,870	2,700
30	4,160		*2,700		2,310	8,800	2,040	*2,900	1,600	5,880	3,650	2,720
31	4,160		*2,700		...	6,420	...	*2,900	1,750	...	3,650	...

Month	Mean Daily Gage Height—Feet			Mean Daily Second Feet				Average Second Feet	Acre Feet		
	High		Low	High		Low			Total	Per Sq. Mile	
	High	Low		Dates		Dates					
January.....	....	....			*8,000			3,700	5,720	352,000	
February.....	....	....	1		3,700			2,800	*3,220	*185,000	
March.....	....	....		26	4,000	25	2,180	2,670	2,870	176,000	
April.....	....	....		30	8,800			2,460	3,480	214,000	
May.....	....	....			*8,000			2,040	3,720	221,000	
June.....	....	....		23	*5,000			1,800	*2,750	*169,000	
July.....	....	....		10	*3,400	29-30	1,600	2,300	2,300	141,000	
August.....	....	....		22	36,500			1,820	7,030	418,000	
September.....	....	....		11	*11,500	30-31		3,650	5,310	327,000	
October.....	....	....		1	3,430	26-27		2,680	3,010	179,000	
November.....	....	....		3	4,300			2,480	2,750	169,000	
December.....	....	....									
Yearly.....	....	....			36,500			1,600	3,730	2,707,000	
										20.4	

\* Partly Estimated

## RIO GRANDE AT LAREDO STATION

**Description:** Automatic water-stage recorder in permanent location after September. Prior to September the recorder was one and one-half miles farther upstream. A cable and car at a point 50 feet below the upper recorder location.

**Records:** Based upon frequent meter measurements. 1925 record poor.

**Remarks:** For fuller station details see 1934 records elsewhere herein and former Water Bulletins.

*Mean Daily Discharge in Second Feet and Annual Summary, 1925*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,550	2,480	2,250	2,350	4,100	110,000	2,700	3,200	12,600	5,800	5,200	3,200
2	2,550	2,580	2,220	2,350	2,800	20,000	3,700	23,200	12,900	7,500	4,950	3,280
3	2,550	2,520	2,250	2,380	2,350	11,500	5,050	13,500	12,100	6,400	4,900	3,250
4	2,480	2,400	2,320	2,620	2,180	10,000	5,800	12,600	11,800	5,850	5,200	3,180
5	2,450	2,480	2,250	2,380	2,050	7,300	6,200	4,500	11,600	5,350	5,300	3,180
6	2,580	2,350	2,250	2,320	2,080	5,650	7,400	4,020	10,700	5,100	6,100	3,180
7	2,580	2,320	2,500	2,320	2,050	5,300	7,600	3,600	17,300	4,400	5,400	3,180
8	2,660	2,300	2,450	2,280	2,020	4,900	5,950	3,850	42,400	4,350	5,100	3,220
9	2,600	2,250	2,550	2,050	4,700	4,720	5,550	8,300	27,000	4,300	4,850	3,200
10	2,620	2,220	2,550	2,100	2,380	5,020	5,020	13,800	29,000	4,650	4,500	3,150
11	2,620	2,220	2,600	2,000	2,600	4,400	4,900	13,500	30,800	5,250	4,250	3,150
12	2,650	2,220	2,600	2,000	3,120	4,500	5,500	18,000	28,800	5,600	4,200	3,180
13	2,650	2,200	2,600	1,980	2,620	4,300	6,300	22,300	27,200	10,000	4,200	3,180
14	2,650	2,200	2,820	1,900	3,180	4,020	10,000	25,200	27,400	8,950	3,980	3,180
15	2,620	2,180	2,650	2,120	3,620	3,820	11,150	28,700	23,000	7,700	3,980	3,200
16	2,620	2,200	2,620	2,020	3,100	3,750	9,150	24,500	*20,000	9,100	3,950	3,180
17	2,620	2,120	2,600	2,220	2,750	3,650	10,600	24,700	*18,000	14,500	3,820	3,180
18	2,620	2,250	2,600	2,000	2,700	3,520	11,500	23,000	*15,500	10,500	3,650	3,180
19	2,600	2,080	2,620	1,920	2,900	3,400	*10,000	23,300	*13,500	7,000	3,550	3,180
20	2,600	2,180	2,650	1,950	2,400	3,350	*9,800	*21,000	*12,000	5,800	3,600	3,180
21	2,600	2,180	2,620	2,020	2,380	3,300	*9,500	*19,000	10,200	6,500	3,480	3,180
22	2,580	2,180	2,720	2,080	2,380	3,380	*8,500	*17,000	8,800	8,800	3,480	3,150
23	2,550	2,120	2,620	2,100	2,280	3,580	*7,700	*15,500	7,850	10,100	3,480	3,180
24	2,550	2,180	2,480	2,100	2,180	3,620	*6,800	*13,000	7,800	9,800	3,300	3,180
25	2,550	2,200	2,500	2,100	2,120	3,420	*6,000	11,400	8,900	9,200	3,300	3,220
26	2,550	2,180	2,500	2,050	2,020	3,200	*5,300	10,600	8,200	8,600	3,300	3,200
27	2,550	2,200	2,550	1,980	1,880	3,080	*4,600	9,200	8,000	7,900	3,320	3,280
28	2,520	2,220	2,520	2,020	1,850	5,350	*4,350	9,450	7,800	7,750	3,320	3,880
29	2,500	2,400	9,200	39,000	3,820	*4,100	9,350	6,900	6,900	3,250	3,920	
30	2,500	2,400	7,700	145,000	3,300	*3,900	9,100	6,750	5,600	3,250	3,900	
31	2,500	2,420	200,000	200,000	....	*3,700	9,320	....	4,850	....	3,800	

Month	Mean Daily Gage Height—Feet			Mean Daily Second Feet			Average Second Feet	Acre Feet		
	High		Dates	Low		Dates		Total	Per Sq. Mile	
	High	Low		Dates	Dates					
January.....	....	....	2	2,650	19	2,450	2,570	158,000		
February.....	....	....	14	2,580	2	2,220	2,280	125,000		
March.....	....	....	29	9,200	14	1,900	2,510	154,000		
April.....	....	....	31	200,000	28	1,850	14,700	906,000		
May.....	....	....	1	110,000	27	3,080	8,640	514,000		
June.....	....	....	18	11,500	1	2,700	6,720	413,000		
July.....	....	....	15	28,700	1	3,200	14,400	888,000		
August.....	....	....	8	42,400	30	6,750	16,200	962,000		
September.....	....	....	17	14,500	9	4,300	7,230	445,000		
October.....	....	....	6	6,100		3,250	4,140	246,000		
November.....	....	....	29	3,920		3,150	3,280	202,000		
December.....	....	....								
Yearly.....	....	....		200,000			1,850	7,130	5,165,000	38.9

\* Partly Estimated

## RIO GRANDE AT LAREDO STATION

**Description:** Automatic water-stage recorder in present location and cable 1½ miles above recorder. Zero of gage at recorder was 352.65 feet, U. S. C. and G. S. mean sea level datum.

**Records:** Based upon frequent meter measurements. 1926 records as here shown are fair.

**Remarks:** For fuller station details see 1934 records elsewhere herein and former Water Bulletins.

*Mean Daily Discharge in Second Feet and Annual Summary, 1926*

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,300	3,120	2,450	2,450	7,920	2,280	3,920	4,620	15,900	5,520	6,500	3,200
2	3,250	3,120	2,400	2,450	8,080	3,850	3,900	5,100	13,700	5,520	6,400	3,220
3	3,220	3,150	2,420	2,450	8,200	3,780	3,880	5,680	10,200	7,200	6,200	3,220
4	3,200	3,100	2,420	2,420	8,220	3,500	4,550	7,750	8,400	7,600	6,000	3,200
5	3,200	3,050	2,450	2,850	10,500	3,280	4,120	6,550	8,250	8,700	5,300	3,220
6	3,220	3,000	2,420	3,080	9,800	2,800	2,700	7,100	7,500	6,700	4,800	3,220
7	3,350	2,980	2,420	2,920	7,900	3,080	2,120	7,980	6,150	6,000	4,500	3,500
8	3,580	2,880	2,450	2,750	7,800	4,680	2,180	6,680	6,000	6,200	4,250	4,500
9	3,480	2,820	2,480	2,420	7,700	6,000	2,880	5,650	5,800	6,300	4,100	5,000
10	3,350	2,820	3,700	5,500	5,550	2,900	5,200	5,420	6,050	3,950	4,600	
11	3,220	2,850	3,150	3,400	3,680	*5,500	2,920	5,650	5,080	5,800	3,800	4,420
12	3,150	2,820	3,150	3,350	3,380	*4,900	2,400	5,020	5,900	5,600	3,700	4,320
13	3,080	2,850	3,000	2,500	3,380	*4,400	3,500	4,350	6,000	5,520	3,650	4,200
14	3,020	2,800	2,600	2,220	3,380	*4,000	5,000	4,120	7,500	5,350	3,600	3,920
15	3,050	2,780	2,380	2,200	3,220	3,650	3,420	4,250	15,500	17,000	3,600	3,750
16	3,020	2,820	2,350	2,180	3,200	3,650	3,280	4,250	16,800	44,000	3,600	3,550
17	3,050	2,780	2,350	2,150	3,180	4,020	2,850	4,180	13,500	25,000	3,600	3,520
18	3,150	2,780	2,350	2,150	6,500	4,300	2,880	3,920	11,500	11,500	3,600	4,850
19	3,220	2,700	2,350	2,150	5,150	6,280	3,100	*5,500	10,300	9,000	3,600	6,050
20	3,280	2,650	2,700	2,080	5,000	3,800	3,150	*5,700	9,200	8,000	3,600	3,600
21	3,250	2,580	2,780	19,000	3,300	5,980	3,150	4,550	8,020	7,800	3,500	3,100
22	3,100	2,580	2,520	75,000	2,980	8,000	3,280	6,100	7,900	7,750	3,450	3,100
23	3,000	2,580	2,400	18,500	2,900	6,020	3,250	6,080	7,500	8,700	3,450	3,100
24	3,000	2,980	2,350	4,100	2,800	4,680	3,600	6,480	7,000	10,800	3,450	3,100
25	3,020	2,600	2,400	*4,600	2,780	*7,000	5,480	8,200	6,500	11,000	3,450	3,500
26	3,220	2,520	2,380	*6,000	2,780	4,100	5,850	7,820	6,250	15,500	3,380	4,250
27	3,200	2,450	4,180	*6,260	2,750	3,080	5,000	17,000	6,100	9,200	3,380	3,950
28	3,180	2,450	3,700	*3,740	2,480	2,980	5,150	18,400	5,700	6,500	3,350	3,950
29	3,150	....	2,520	*5,200	2,480	3,200	5,350	13,700	5,680	6,500	3,320	3,850
30	3,080	....	2,550	6,300	*2,700	3,980	3,700	15,500	5,520	6,400	3,300	3,600
31	3,100	....	2,520	....	*3,400	....	3,820	17,500	....	6,700	....	3,500

Month	Mean Daily Gage Height—Feet	Mean Daily Second Feet				Average Second Feet	Acre Feet		
		High		Low			Total	Per Sq. Mile	
		High	Low	Dates	Dates				
January.....	4.41	4.16	8	3,580	23-24	3,000	3,180	196,000	
February.....	4.21	3.74	3	3,150	27-28	2,450	2,810	156,000	
March.....	4.85	3.73	27	4,180		2,350	2,650	163,000	
April.....	18.24	3.50	22	75,000	20	2,080	6,750	401,000	
May.....	7.20	3.60	5	10,500	31	2,200	4,940	304,000	
June.....	6.02	3.64	22	8,000	1	2,280	4,410	262,000	
July.....	5.48	3.50	26	5,850	7	2,120	3,650	225,000	
August.....	9.09	4.72	28	18,400	18	3,920	7,440	457,000	
September.....	8.74	5.26	16	16,800	11	5,080	8,490	505,000	
October.....	12.20	5.25	16	44,000	14	5,350	9,660	594,000	
November.....	5.69	4.35	1	6,500	30	3,300	4,080	243,000	
December.....	5.88	4.20	19	6,050	21-24	3,100	3,810	234,000	
Yearly.....	18.24	3.50		75,000		2,080	5,170	3,740,000	
								28.1	

\* Partly Estimated

## RIO GRANDE AT LAREDO STATION

**Description:** Automatic water-stage recorder in present location and cable 1½ miles above recorder. Zero of gage at recorder was 352.65 U. S. C. and G. S. mean sea level datum.

**Records:** Based upon frequent meter measurements. 1927 records as here shown are fair.

**Remarks:** For fuller station details see 1934 records elsewhere herein and former Water Bulletins.

## Mean Daily Discharge in Second Feet and Annual Summary, 1927-1927

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,140	†3,400	3,180	2,460	2,230	1,980	†4,950	↑	*5,300	11,500	†3,000	↑
2	3,080	†3,400	3,150	2,420	2,40	2,010	†4,950		*6,100	8,500	†3,000	
3	3,180	†3,400	3,120	2,460	2,270	1,960	†4,950		*5,400	10,400	†3,000	
4	3,210	†3,400	3,090	2,450	2,280	1,950	†4,950		*4,800	12,200	†3,000	
5	3,180	†3,400	2,980	2,460	2,270	1,930	†4,950		*4,300	*12,000	↑	
6	3,160	†3,400	2,900	2,590	2,240	2,340	8,080	†2,800	†3,800	*10,000		†2,800
7	3,160	†3,400	2,880	2,830	2,180	2,980	8,080		†3,300	5,980		
8	3,160	†3,400	2,930	2,500	2,170	3,150	9,000		†3,250	5,650		
9	3,150	†3,400	3,100	2,340	2,160	3,110	†5,200		†3,200	19,100		
10	3,140	†3,400	2,990	4,820	2,160	2,480	†5,200		†3,100	15,700	↓	
11	3,140	†3,400	2,880	4,070	2,120	2,110	†5,200		†3,000	5,750		†2,700
12	3,140	†3,400	2,820	3,450	2,100	2,080	2,110		†2,900	*4,500	↑	
13	3,140	4,360	2,780	3,330	4,460	2,060	2,060		2,850	*4,500		
14	3,110	4,360	2,740	3,320	3,740	3,280	1,980		2,820	*4,500		
15	3,060	4,180	2,700	3,320	2,810	2,780	1,830		2,520	*4,500		†2,600
16	3,060	3,440	2,670	3,320	3,210	4,440	2,080		2,780	*3,500	†2,800	
17	3,020	3,300	2,670	3,210	2,990	4,440	2,220	↓	†2,700			
18	3,020	3,320	2,660	2,750	2,340	5,020	†3,700	3,080	†2,700			
19	3,020	3,260	2,600	2,450	2,030	5,290	†4,600	2,710	†2,700			†2,650
20	3,040	3,560	2,670	2,380	2,170	5,050	†3,200	2,630	2,660			†2,750
21	3,020	4,490	2,640	2,360	2,460	3,350	†2,800	2,700	2,360			†2,800
22	3,020	3,940	2,550	2,410	2,270	3,530	2,430	2,750	2,780			†2,900
23	3,000	3,450	2,540	2,640	2,000	3,300	2,260	2,750	3,120			†3,050
24	3,050	3,450	2,510	2,380	1,960	3,600	2,080	2,750	3,380	†3,000	↑	
25	3,050	3,450	2,470	2,270	2,050	5,350	1,960	2,780	3,530			
26	3,050	3,440	2,400	2,280	2,100	6,240	2,060	2,500	3,820			
27	3,050	3,420	2,320	2,270	2,020	6,430	2,180	2,960	3,890			†3,100
28	3,050	3,300	2,860	2,150	1,970	4,210	*2,800	2,810	4,070			
29	†3,400	....	4,540	2,220	1,950	*4,950	*2,800	*2,800	4,460			
30	†3,400	....	2,780	2,220	1,930	†4,950	*2,800	*3,300	8,080	↓		
31	†3,400	....	2,500	....	1,960	....	*2,800	*3,800	....	....	....	↓

Month	Mean Daily Gage Height—Feet			Mean Daily Second Feet				Average Second Feet	Acre Feet		
	High		Low	High		Low			Total	Per Sq. Mile	
	High	Low		Dates		Dates					
January.....	....	....	21	†3,400		....		3,120	192,000		
February.....	5.61	....	4,490			2,320		3,550	197,000		
March.....	5.69	4.18	29	4,540	27	2,830		2,830	174,000		
April.....	5.79	4.04	10	4,820	28	2,150		2,740	163,000		
May.....	5.59	3.85	13	4,460	30	1,930		2,350	144,000		
June.....	6.58	3.85	27	6,430	5	1,930		3,540	211,000		
July.....	7.60	....	8	9,000		....		*3,750	*231,000		
August.....	4.74	....	31	3,800		....		*2,840	*174,000		
September.....	7.28	....	30	8,080		....		*3,660	*218,000		
October.....	10.68	....	9	19,100		....		*5,910	*364,000		
November.....	....	....	....	†3,000		....		†2,830	†168,000		
December.....	....	....	....	†3,100		....		†2,830	†174,000		
Yearly.....	10.68	....		19,100		....		3,330	2,410,000	18.1	

\*Estimated.

\*Partly Estimated

## RIO GRANDE AT LAREDO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car. Cable and car located about  $2\frac{1}{2}$  miles above the cities of Laredo, Texas, and Nuevo Laredo, Tamaulipas. Water-stage recorder attached to north abutment of railroad bridge at Laredo. Zero of gage at the cable, elevation 353.15 feet. The water-stage recorder was first located near the cable using the above gage. The recorder was moved to its present location in January, 1926, and zero of gage was elevation 352.65 feet. On October 25, 1930, zero of gage at recorder was changed to elevation 351.50 feet. All gage elevation are on United States Coast and Geodetic Survey sea level datum.

**Records:** Based on frequent meter measurements during the year. Computations by shifting channel methods. 1928 records considered good.

**Remarks:** The river flow at this station is modified by many irrigation diversions and Elephant Butte reservoir in the United States and by many irrigation diversions and Boquilla dam in Mexico. This station was operated by the Monterrey Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated the drainage area above this station is 132,915 square miles, of which 91,516 are in the United States and 41,399 in Mexico.

## Mean Daily Discharge in Second Feet and Annual Summary, 1928

Day	Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1			2,860		2,080	2,270	1,850	3,810	9,640	6,380	3,740	3,900	
2	^	^	2,650		2,130	2,980	1,850	3,390	8,390	6,270	3,550	4,010	
3			2,460		2,070	4,430	1,790	3,850	7,110	5,680	3,690	3,900	
4			2,460		1,990	8,830	1,690	4,510	7,130	5,660	3,670	3,940	
5			2,710		4,360	6,240	1,690	4,410	6,360	5,520	3,820	3,560	
6			2,660		7,660	5,150	1,810	8,100	5,190	5,440	3,760	3,450	
7			2,730		5,440	3,500	1,820	4,230	5,370	5,360	3,720	3,470	
8			2,890		4,110	2,710	1,870	4,270	5,340	5,360	4,070	3,270	
9			2,550		3,700	3,460	1,940	3,670	5,170	5,050	4,480	*3,400	
10			2,430		*3,300	2,730	1,860	10,500	5,850	4,680	4,230	3,530	
			*2,900		*2,100								
11			2,340		*3,000	2,480	1,820	19,100	15,300	4,480	4,230	3,710	
12			2,550		2,810	2,510	1,820	19,100	19,000	4,260	4,230	3,790	
13			2,370		8,960	2,680	1,990	8,480	8,360	4,120	4,370	3,740	
14			2,310		7,690	2,200	2,350	6,610	7,960	4,190	4,400	3,770	
15			2,270		10,000	2,200	2,390	6,090	4,630	4,190	4,370	3,970	
16	*2,900		2,270		10,900	4,870	2,230	6,310	4,100	3,990	4,180	4,210	
17			2,330		7,070	6,670	2,070	5,730	3,700	3,870	4,120	4,060	
18			2,420		4,560	5,620	1,800	5,660	3,440	3,990	4,210	3,820	
19			2,200		3,670	3,290	1,690	5,800	3,420	3,900	4,180	3,770	
20		V	2,040		3,370	2,600	1,810	5,850	3,370	3,660	4,110	4,120	
21			*2,800	^	3,760	2,420	1,820	5,100	3,150	3,670	4,070	3,870	
22			2,680		5,320	2,250	1,820	6,210	10,100	3,820	4,060	3,690	
23			2,680		*4,200	2,310	1,860	8,020	51,600	3,870	4,020	3,690	
24			2,910		2,130	*3,800	2,330	2,580	7,400	23,700	3,510	4,010	3,690
25			2,910		2,130	*3,600	2,370	2,350	5,620	14,400	3,400	4,060	3,720
26			2,890		2,110	*3,500	2,330	2,270	5,530	9,580	3,500	4,010	3,740
27			2,570		2,110	3,500	2,480	2,350	5,710	9,510	3,630	3,770	3,640
28			2,540		2,110	3,440	2,360	8,100	5,570	8,220	3,800	3,690	3,610
29			2,840		2,110	3,060	2,060	9,870	5,170	7,210	3,670	3,800	3,580
30		V	2,130		3,400	1,890	8,750	9,270	6,720	3,630	3,850	3,550	
31			...		2,860	...	5,460	11,900	...	3,840	...	3,690	

Month	Mean Daily Gage Height—Feet	Mean Daily Second Feet						Acre Feet		
		High			Low			Average Second Feet	Total	Per Sq. Mile
		High	Low	Dates		Dates				
January.....	....	....	....	....	....	....	....	*2,900	*178,000	
February.....	....	....	....	....	....	....	....	*2,860	*164,000	
March.....	....	....	....	....	....	....	....	*2,340	*144,000	
April.....	....	....	....	....	....	....	....	*2,100	*125,000	
May.....	7.41	....	16	10,900	4	1,990	4,490	276,000		
June.....	6.23	4.72	4	8,830	30	1,890	3,370	201,000		
July.....	7.45	3.61	29	9,870	4-5	1,690	2,750	189,000		
August.....	9.78	4.79	11	19,100	2	3,390	6,930	426,000		
September.....	14.70	4.66	23	51,600	21	3,150	9,430	561,000		
October.....	6.33	4.72	1	6,380	25	3,400	4,400	271,000		
November.....	5.35	4.82	9	4,480	2	3,550	4,020	239,000		
December.....	5.22	4.63	16	4,210	8	3,270	3,740	230,000		
Yearly.....	14.70	3.61		51,600		1,690	4,120	2,984,000	22.5	

\*Partly Estimated